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NEWS IN BRIEF

**Productivity
talks at ICL**

A MEETING between ICL and union representatives earlier this week considered proposals for the next self-financing productivity scheme. The present scheme finishes in September, at the end of the company's financial year.

It is believed that the unions will be seeking a number of important changes to the scheme, if it is to continue, including the consolidation of bonus payments into basic pay.

Takeover

EXPANDING South-Coast bureau, Jackson Associates of Chichester, has taken over another company in the town, PS Computing Services. The takeover of the new combined concern will be roughly £1 million in 1978. Jackson Associates recently bought Scope Computing Services (CW, July 13).

DEC profits up

CONTINUING to grow at an impressive rate, Digital Equipment has reported worldwide sales of \$1,426 million for its 1978 financial year ended July 1, an increase of 30% over the previous year. Net profits were also up — from \$108 million to \$142 million.

NCC appointments

THE names of the remaining members to be appointed to the Technical Advisory Committee of the National Computing Centre have been announced. They are: Reg Boot, NCC development director; John Leighfield, director of systems at Leyland Cars; Professor David Aspinall from UMIST; and John Pearce, managing director of Inscat.

Latest: New ICL

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CDC buys one-third share in OCR maker Scandata

A LOW-COST OCR page reader and a high speed OCR document reader both built in the US by CDC, are now being sold in Europe by OCR specialist, PCR Scandata. This follows a deal signed between its US parent, Scandata Corp, and CDC, under which the latter has acquired long-term notes and preferred stock that would give CDC a one-third share in Scandata if converted to common stock.

The low-cost page reader is called TOCR. Terminal OCR, and can cost as little as £20,000. TOCR can read OCRB font and numeric hand-printed characters at a rate of up to 884 chps, which means that it can process five full 8 1/2 x 11 inch pages per minute. It can be used as a terminal device to a mainframe or as part of a mixed media data entry system.

The document reader is the CDC 929 which can read single line documents at a rate of 1,200 a minute. It can recognise any two of four different fonts — OCR-A, Farnington 78, OCR-B numeric and E138 numeric.

Scandata says that CDC has transferred its inventory of 929s and TOCRs to Scandata under the deal between the two firms. TOCR will definitely continue to be manufactured either by CDC or by Scandata, but the continuance of 929 manufacture will depend on how many 929s are sold by Scandata.

● The agreement between Scandata and another US-based OCR firm, Optical Business Machines of Melbourne, Florida, under which OCR Scandata sold OBM's Laser OCR-One system in Europe, has been terminated. OBM has set up its own European subsidiary, Transworld Optical Business Machines Ltd.



Council system finds model plane winners in minutes

COMPUTER staff from Merseyside County Council came to the rescue of competitors in the Federation Aeronautique Internationale Model Flying World Championships held at RAF Woodvale, Southport, last week when they used the council's ICL 1904S system to cut down the analysis time of scores and positions from the usual weeks to a matter of minutes.

Installing an ICL 7502 terminal system and four VDUs in a caravan at the air base, Merseyside computer staff took scores cards marked up by judges and input the data via the VDU into the ICL 1904S which is based in Liverpool, a Post Office time being used to send the data.

Then at about 15 minute intervals up-to-date positions and scores for the five competitions — combat, aerobatics, speed, team race and radio control — were produced.

Also, every evening, end-of-day results were printed out and despatched to Liverpool University where the competitors stayed, and following a draw to decide the next day's flying order, a print-out of this was also made.

● In the picture, David Holt (foreground), Merseyside's chief programmer, checks some of the scores, while behind him is Mike Shaw, deputy director of Merseyside's joint computer unit, and Phil Langman and Bernadette Coyne, both Merseyside council programmers.

Gray introduces own front end

A FRONT end processor for the Cray-1 will be introduced next year by Cray Research. It is to be offered as a purpose-built alternative to the IBM and CDC mainframes that need to be used as front ends at the moment.

One existing Cray-1 user, the European Centre for Medium-range Weather Forecasts at Shinfield Park, Reading, has a CDC Cyber 175 front ending its machine. The director of the centre, Dr Wilm Neilson, told Computer Weekly, "It is unfortunate that Cray Research did not introduce its front end processor a year or two ago, but we are now committed to the Cyber 175 for some time."

Cray says that its front end processor will be more tailored to the Cray-1 than the IBM or CDC machines used at present.

BCS competition for students

A SECOND computing competition for students is to be held by South Yorkshire branch of the BCS during the next academic year. There will be a section of the competition each for students from schools, colleges, polytechnics, and universities in the South Yorkshire area, and prizes will be awarded for different age groups and curricula followed.

Entries may consist of a description or analysis of a particular aspect of computing, or a definition of a program or system designed for a specific purpose. The intention is to encourage a wide range of entries from students in the arts, commerce, engineering and science, as well as computer science.

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**South Africa
aims for DP
independence**

TO beat any ban that may be imposed on the sale of computer equipment to South Africa, the government there is looking at the possibility of stepping up home production, and may even go into mainframes and CPUs. But this is still very much at the discussion stage.

A meeting was held last week under the auspices of the SA Computer Society entitled "The Domestication of the South African Computer Industry". Several companies at the moment are making components and terminals, some of which are even being exported to Europe, but a full-scale manufacturer is still only a talking-point.

The government-backed Council for Scientific and Industrial Research is interested in the manufacture of certain units of computer systems, but feels that most work would have to be done by private companies, possibly with government backing.

Meanwhile, reports that ICL planning to set up a factory in South Africa have been denied by the company. Peter Hall, director of corporate communications, said, "We are not thinking of setting up a manufacturing capability there."

The same was true, he said, about refurbishing plants in South Africa. There was no particular intent to expand there at the moment. "We have plans to expand in all our territory," he added.

ICL has had considerable sales success in South Africa since the US companies pulled out because of their government's boycott. The latest sale, to the police, was revealed last week (CW, August 10).

Rent rise upheld

THE Price Commission has upheld IBM's increase in the annual rental payable by UK users of its CICS teleprocessing monitor. The case was taken to the commission by the CICS Guide User Group, which complained that the price rise, from £5,000 to £8,000, coincided with a reduction in the level of support (CW, June 22).

● UK Level 61 users want upgrade — see page 9

**Honeywell
offers low
cost version
of Level 62**

A LOW-COST packaged version of the Honeywell Level 62 small business system has been introduced which lowers the minimum price of a Level 62 configuration to £48,350.

The new model, called the 62/10, is aimed at first time users, who are now offered an extended on-site growth path right up through Level 62 without having to alter their software as they grow.

The minimum configuration includes a 128K-byte processor with console, two 40 Megabyte disc drives, a 300 lpm printer and all communications controllers and ports. For those who want to attach terminals from the start, a 62/10 Distributed Systems Environment configuration with the same processor, discs and printer, and three asynchronous display terminals, costs £50,400. For a 192K-byte transactions processing system with the same complement of peripherals, the price is about £58,000.

Level 62, which has had several successful years competing directly with IBM's System 3 line in a predominantly batch environment, is fast evolving into a product oriented towards online transaction processing.

Towards are now five models in Level 62, the 10, 20, 40, 50 and 80, and users can field-upgrade right through the line.

Union talks at ICL

FURTHER talks are to take place between ICL and staff unions on the possible format of the self-financing productivity scheme for 1978/79. Following a meeting last week at which the company set out its proposals (CW, August 17), another meeting has been arranged for September 22 in Birmingham.

Micro impact

UNION officer Tim Webb of ASTMA has called on the Manpower Services Commission and the Engineering Industry Training Board to set up a joint study on the effect of microprocessors on employment, with particular reference to the problems of retraining.

Standard warning

IF the US government adopts the US National Bureau of Standards proposal that IBM's 308/3070 I/O interface should become a standard (CW, July 27), Honeywell will withdraw from looking for new US federal systems business. Honeywell's single unit robotics for special attention, and is recommending that a separate panel be set up to control the placement of research grants for robotics.

Unsettled

THE trade secrets squabble between Mostek and the NEB's some venture is now likely to be settled out of court following the cancellation of this week's Dallas court hearing by a Texas judge. Four more former Mostek employees have joined Immos, and the US company was confident that technical information would be divulged (CW, August 17). Immos director Iannacopoulos said that he expected the matter would be settled soon.

RAIR Panel

RAIR compiler is being developed by GSC Computers for the 1900 Series machines. The software, including a standard compiler and associated library routines, will be available under the CR operating system and will be available in the near future.

**Briefing
GA beats IBM
into Citibank**

AGAINST fierce competition from IBM with the Series 1 minicomputer, General Automation has won a major contract from Citibank of New York to supply hardware for a \$100 million banking network.

The system involves 11 centres, each of which is to be equipped with dual GA 16/400 minicomputer. The contract, worth \$5.5 million over two years, also involves hundreds of GA 16/220 two-board microcomputers. IBM had complexes of five Series 1 at each centre with no local intelligence.

**Electronic mail
draws nearer**

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Anderson also believes that Xerox will announce within the next few months a store-and-forward facsimile service.

SRC £10m robotics research

FIVE years after it published a report throwing cold water on research into robotics, the Science Research Council is likely to initiate a £10 million research programme into the subject.

The SRC panel investigating new areas of application and technological developments for microelectronics has decided to single out robotics for special attention, and is recommending that a separate panel be set up to control the placement of research grants for robotics.

Call for national publicity campaign

MORE inquiries are needed into the effect of computers on the service industries, according to a report by the National Electronics Council. In addition, the report says, a national publicity campaign is needed to impress on people the importance of computers in society.

One of the Council's specific recommendations is that the

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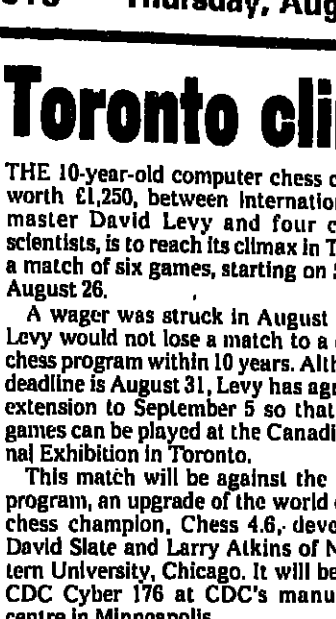
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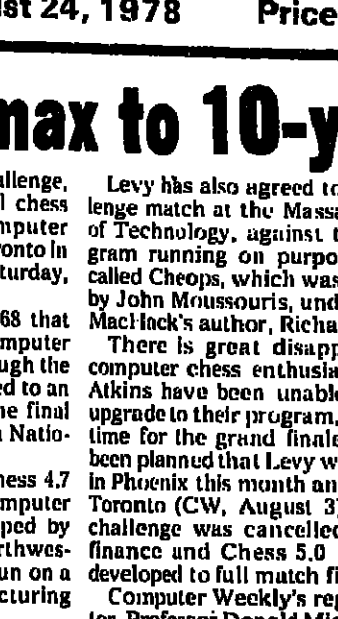
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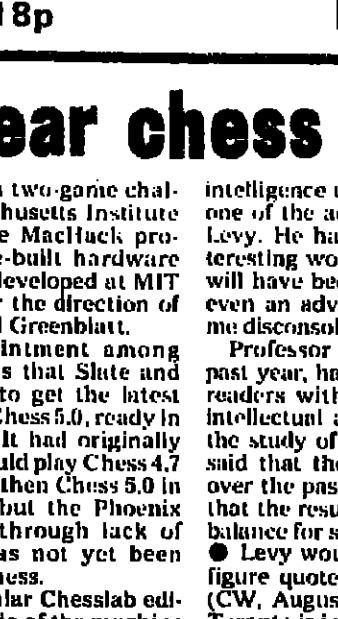
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ADVANCE TOWARDS THE AUTOMATED OFFICE

**Three in battle for
intelligent copier**

THE all-electronic office will soon be much closer to reality, as a word processing product, currently under test by three separate manufacturers, comes on to the market. This is the "intelligent copier", a device which combines the functions of copier and xerographic printer, and which promises to form the basis of integrated office systems of the future. (writes Rory Johnston).

The three companies known to be well along the road on intelligent copiers are Wang, Xerox and Toshiba. The Wang machine will probably reach the market first. This will start field trials in a few weeks. Estimates of its eventual sale price range from \$15,000 to \$30,000.

The Xerox machine, called the Advanced Multi-Function Workstation, is still very much an experimental model, but is being field-tested by, among others, President Carter's staff in the Executive Office Building in Washington. Two units have been in use there since May.

The principle behind all the machines is the same. They act as printers for a word processor by generating characters in a high-resolution dot matrix by hardware, and "painting" the characters on to the drum of a xerographic copier, either by

● Turn to page 16

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GILB'S MYTHODOLOGY

Mecca method for comparing systems...



ONE of the management methods which consistently scores high among my course participants is the Mecca method. Mecca stands for Multi-Element Component Comparison and Analysis. Mecca is a technique for helping compare any two or more competitive alternatives. Mecca is not needed if the only comparison criteria is simple, say the price as an example. But it will be appreciated if the choice is complicated, and based on many variable qualities which must be considered at the same time. This situation is common in the computer business.

Thus Mecca was originally heavily used to help compare computer selection choices, and is now frequently used to help evaluate such questions as the best software package, the best operating system or the best database software.

The idea is not new. I have a letter 200 years old from Benjamin Franklin to Joseph Priestley which advised him to use a variant of the method to solve his decision-making problem. Ten years ago, I presented the method to the National Computing Centre, who years later reported to me that they had spread it widely in the UK for computer selection purposes. The usefulness of Mecca is first perceived by those who have had to struggle with the problem of

evaluating our complex hardware and software systems. I should mention that it has other uses, and has been used to evaluate job candidates, organisational decentralisation, and atomic energy plant selection too.

In a very brief space, I shall sketch the method. Step 1: A list of the major quality criteria is made. If necessary a hierarchical (root like) breakdown can be made for detail.

Step 2: Percentage (of 100% of any group of quality criteria) weights are assigned to each quality area. These should ideally be in proportion to the long term economic impact of variation in the quality being weighted. In any case, the evaluation group and higher management should agree on the weightings.

Step 3: Facts are collected about all the qualities being evaluated. When most relevant data seems to be in hand, a relative score is given for each alternative design being evaluated, at the most elementary (detailed) level of the Mecca model.

The scoring system gives five points for "average" quality (within that group being evaluated) and down to zero in steps of one, or up to 10 (meaning as good as is interesting or useful).

Step 4: The weighted average score is computed up through the model hierarchy.

PROGRAMMER NOTES

THE debate over the proper sphere of application for Basic remains lively.

Suggestions that the language could legitimately be applied to a wider range of applications (Programmer Notes, March 16) have stimulated at least one reader to experiment successfully with Basic for production jobs.

Meanwhile, a lecturer from

Some Basic experiments

the University of St Andrews has written to argue against the use of the language in teaching.

Anna Brambi, from Treviso in Italy, writes (in Italian) that "stimulated by the article, I quickly implemented a variety of facilities that had occurred to me, using Basic in batch mode on a large remote computer".

"Allowing for possible misinterpretation from the Italian, Ma Brambi says that, 'Using Basic, I was able to set up security files controlled by a cryptarithm (cryptographic algorithm?) and a variable password'.

"Without going into detail, these enabled me to control access and multi-user updating of my database from all parts of Europe, Asia, and America."

A. J. T. Davis, a lecturer in the Department of Computational Science at St Andrews, addresses the disquiet felt by many at the use of Basic for initial instruction in programming.

"Experience as a teacher has shown me that once a programmer has learnt a structured language like Pascal or Algol, he very easily learns other languages: structured or unstructured."

However, if he has been brought up on some unstructured language — and my experience is with Fortran users — he finds it very difficult to accept the concepts of higher-level languages, let alone learn them.

Although it is possible to do structured programming in Basic, the language makes it very difficult to teach in most languages you are to name, but it is made much more difficult if there are no facilities in the

SOFTWARE FILE-1

CA moves on SNA emulator pack

A COMMITMENT to IBM's Systems Network Architecture has been made by Computer Automation, which says that it will later this year provide SyFA users with an IBM 3790 emulation package based on SDLC line protocol.

The company has also announced screen management software for its SyFA systems and a new disc-based operating system for the Naked Mini 4 family of OEM minicomputers.

The new SDLC facility, which allows one or more SyFA systems to communicate with a 370

mainframe, uses a dedicated microprocessor as a front-end in conjunction with a software emulator executing in the SyFA's main memory.

It will support SNA communications initiated by any of the 24 terminals attachable to a SyFA system.

The SDLC Processor, priced at £4,500, and the SNA-3790 software, also priced at £4,500, further expand the range of SyFA communications facilities, which already includes emulators for 2780 and 3780 RJE and an interactive 3270 emulator.

Called Panel Manager, the new screen handling software allows the programmer to create terminal layouts interactively. The system also enables the user to define data input edit rules, which will be applied automatically by the software.

In its first release a single user development system, OS4 offers Naked Mini users facilities based on a real-time executive and file manager which will now be common across the hardware range.

Program development facilities include source and line editors, a macro assembler and linker, and a debugging module. Currently supporting Fortran and Assembler, the system is expected to add Cobol and RPL/2 in the near future, according to a spokesman. Subsequent releases will also be fully multi-user, he added.

Further development of IC testing system behind takeover

THE further development of a software system for testing integrated circuit boards is cited by Teradyne Inc, of Boston, as the chief reason for its takeover of a software house based in Dallas, Texas.

The company, Digitest Corp, is the developer and owner of a program known as D-Laser, which Teradyne makes available to its customers as P400 on University Computing Company's time sharing network.

By acquiring the assets of Digitest Corp, Teradyne will gain technical control over the future development of the software, said a spokesman.

P400 is said to be the only commercially available software that can automatically generate complete input test patterns to provide high fault coverage on complex IC circuit boards.

It may be used to generate test

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SOFTWARE FILE-2

Top Coral man for BCS talk

One of the leading proponents of Coral, Professor Michael Griffiths of Nancy University, France, will be the speaker at a meeting of the BCS specialist group concerned with the development of languages similar to those involved in the US Defence Department Ironman project. The meeting is on Thursday, August 31, at the Polytech-

nic of Central London, at 6.30pm. Professor Griffiths, whose talk is entitled Program Transformation, has been working on the development of languages similar to those involved in the US Defence Department Ironman project.

Ansi moves on standard text processing language

A COMMITTEE sanctioned by the American National Standards Institute has begun work on the formulation of a standard end-user language for text processing. The committee, under the auspices of the Computer and Business Equipment Manufacturers' Association, aims to have a complete draft ready late in 1980 and an approved standard by early 1982.

The team, which comes under the jurisdiction of Ansi's X3J6 division, is also seeking to attain recognition as an ISO working group, according to the chairman, Charles Card of Uni-

vac. The proposed standard will encompass both the syntax and the semantics of the language, according to Card. Its scope will include the definition, description, recording, recall, transformation, searching, manipulation and display of text.

A major overlap was inevitable with word-processing and computer graphics, noted Card. However it was not part of the committee's intention to standardise in these areas too. Nonetheless the group had official procedures for liaison

with Ansi's X4A12 committee, which was working on a standard alphabet and keyboard for word processing, and the two teams also shared a number of participants, he said.

The standard will include a section covering systems for information retrieval, which the recently formed UK group is also examining (CW, June 29).

Use of the language would by no means be restricted to computer professionals, noted Card, but would include predominantly secretaries and clerks. Such users, as well as those more experienced, found the differences between existing systems very difficult to work with.

The primary thrust for the standard had indeed come from the end-user community.

Some indication of the intended shape of the new language is provided by systems that the group has already studied.

These include Honeywell's GCOIS text editor, IBM's ATMS, QED from Bell Labs, MIT's expansion of QED-QEDX, NLS developed by the Stanford Research Institute, Wylbur, EDU and others.

The new language would in

Details of US micro development tools

DETAILS have come to light of a very comprehensive range of microprocessor software development systems produced by a software house in Waltham, Massachusetts.

The systems, which are sup-

ported on a variety of Digital Equipment and Data General machines, are also available on several international time sharing services.

Developed by The Boston Systems Office Inc, the software

includes cross-assemblers, linkage editors and simulator debuggers for most current microprocessors.

Devices supported include those manufactured by Advanced Micro Devices, AMI,

Fairchild, Hitachi, Intel, Intersil, Musick, Motorola, National Semiconductor, RCA, Rockwell, Synertek, Texas Instruments, Thomson-CSF and Zilog.

The tools, which are all written in the host computer's assembler, run on PDP-8, PDP-11, the DECsystem 10 and 20. Data General computers which can host the software include the Nova, SuperNova and Eclipse.

For the most widely used microprocessors, BSO in addition offers high-level language facilities. These include cross-compilers for Fortran IV and Pascal as well as Basic.

Features of the cross-assemblers include conditional assembly instructions and macro capabilities based on string replacement of arguments.

They also have the important ability for RAM/PROM segmenting, so that program and data sections can be directed to either random-access or read-only memory as appropriate.

Because they are written in assembler, the cross-assemblers and simulators offer major savings in CPU time over similar products implemented in high-level languages.

For example, the cross-assembler for the Intel 8080 has been shown to produce a reduction of 20 to 1 over Intel's own 8080 cross-assembler, written in Fortran. Other tests have shown a reduction of as much as 70 to 1.

The company, which is actively seeking an agent in the UK, declined to identify specific time sharing networks through which the software could be accessed in Europe.

Ventek's
IBM RJE
emulator

A SINGLE software package capable of emulating several IBM RJE terminals has been released by Ventek for its Onpoint systems. The program, Multiple Terminal Operator, allows the operator to select either IBM 2780, Hesp, RES, or JES workstation emulation.

In a typical MTE implementation, the company, the operator key in data locally to update or create data files. When ready for transmission to the mainframe, the system displays to the user a menu of transmission options.

The operator can then select the appropriate emulation mode by a simple keyboard entry.

MTE operates on Datapoint 1130, 2200, 5500, and 6600 systems with at least 16K bytes of memory.

SPL opens research centre

A SOFTWARE research centre has been opened by SPL in Abingdon, Oxfordshire. An early project for the centre, to be staffed initially by 30 senior consultants from throughout the company, will be the

implementation of a real time Pascal compiler. Intended to consolidate and expand the company's basic research activities, the centre will also begin work soon on various new projects.

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High-level language for J100 Videocomputer

A HIGH-LEVEL user-oriented programming language has been introduced by Jacquard Systems for users of the J100 Videocomputer. Meanwhile, Business Research Ltd, of London, has produced a range of commercial application packages which run on both J50 and J100 systems.

The new Jacquard language, known as Data-Rite, is intended particularly for handling disjunctive files and data entry applications. Typical applications are: entry stock

recording and mailing lists. This package, which is supplied to users free of charge, consists of two main components: Data-Form for handling VDU formats and record layouts; and Data-Talk, a command language for handling input and output.

Data-Rite also supports information sharing in a network of J100s connected together or linked to a mainframe. In the latter role, it facilitates the offloading of mainframe jobs to a J100 in gradual steps, notes the company.

Business Research Nubus range cover sales order processing, invoicing, stock control, and purchasing functions as well as the sales, purchase, and nominal ledger accounting.

Also available are systems for budgeting and financial modelling, management accounting, and product costing.

The software, which allows the user to design his own screen and report formats using parameters, can operate concurrently with standard Jacquard systems such as the word processing package Type-Rite IV.

Packages available from the

PEOPLE

Belfast bureau to run 333 miles for charity

A MARATHON charity run organised by independent Computer Services of Belfast will cross Ireland diagonally from the extreme north-east to the south-west, and will cover 333 miles, finishing at Cork on September 16.

ICS hopes to raise £5,000 from the run, to be divided between the Northern Ireland Association for Spina Bifida and Hydrocephalus, the Northern Ireland Leukaemia Research Fund, St Anne's Skin and Cancer Hospital, Dublin and the Balmintree Spinal Clinic, Cork.

The runners, divided into three teams, will each run one or two 30-mile beats.

Deputy managing director Nelson Miller will lead one of the teams, and every section of ICS staff, including programmers, cleaners, managers and operators, will be represented.

Old Bushmills Distillery in Co Antrim and Thre's Stripe International in Co Cork, ICS' northernmost and southernmost customers, are the starting and finishing points of the run.

Donations will be welcomed, and should be addressed to The Secretary, ICS Marathon Charity Run, c/o Independent Computer Services Ltd, Queen's Road, Belfast BT3 9DT.

Geoffrey Stearnman has been appointed marketing director of Feedback Instruments, and will continue as technical director. Trevor Anderson has been promoted from assistant development manager to development manager of Feedback.



Stephen Hill, previously systems manager for Fine Fare, has become data systems controller for Ladbrokes holidays and hotels division.

Peter Clements, previously operations manager with On-Line Systems, has joined ADP Network Services as European operations manager.

Plessey director retires

A CAREER spent entirely in telecommunications has ended for John Ireland, who retired as director of trade relations and projects of Plessey Telecommunications International recently.

He gained an engineering degree from Imperial College in the 1930s and spent two years with STC before joining the Royal Corps of Signals in 1939.

During the war he attained the rank of Lieutenant-Colonel and in 1946 was awarded the MBE for the part he played as second-in-command of the Second Army Signals, in providing communications during the Normandy landings and the advance into occupied Europe.

After several years with the Post Office and Cable and Wireless, in 1953 he joined AT&E to lead the System Planning Group set up jointly with BICC.

In 1959 he became chief engineer, and when AT&E was acquired by



Ireland, held both technical and marketing appointments within the company.

Colin Hughes has joined Anderson Jacobson as financial controller and company secretary, after holding the same post with Computer and Systems Engineering.

Alex Park has joined STC as director financial controller. He has been retained as a consultant by Lorrho since March, when he gave up his job as chief executive of British Leyland.

Derek Newman, hitherto group controller of management services with Racal, has been appointed to the board of Racal Group Services as director of management services. This is a newly-created position.

Tony Woodliss, previously regional manager, government and public corporations division for Rediffon Computers, has joined General Computer Systems as territory manager for the Eastern counties and North London.

John Thomas has left ICL Data-ski, where he was supervising factors trials of 2870, 2878 and 2880 systems, to become operations manager of Safe Computing's bureau services division.



National Management Game winning team from Shell receive a £1,000 cheque and subsidiary prizes from (right centre) Harold Lever, Chancellor of the Duchy of Lancaster, and (left centre) Fredy Fisher, editor of the Financial Times. The team are (left to right) Nigel Warner, Geoff Brown, Lech Zwierszynski, Steve Phillips and Gilla Surle.

Shell winners of National Management Game

THE 1978 National Management Game was won by a team from Shell UK, whose "company" made a profit of £8.1 million. Second, third and fourth places in a close contest were held by teams from IBM, chartered accountants Thornton Baker, and again IBM.

The winning team will represent the UK in the international finals, the European management championship, which will be held in Stockholm on September 6-9.

The game is sponsored in the UK by ICL, the Financial Times and the Institute of Chartered Accountants in England and Wales, in association with the Confederation of British Industry and the Institute of Directors.

The countries taking part at present, besides the UK, are Denmark, France, Germany, the Irish Republic and Sweden, but it is hoped that many more countries will join in next year.

All the participating countries use the Nimex program, which was originally developed by ICL for the UK Game.

Details of the 1978 Game can be obtained by telephoning 01-347 7808.

Harry Bradley of RCA has been appointed marketing and sales manager. Until recently he was technical services manager.



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Gerry Ricks has joined CAP as computer resources manager. His last job was as managing director of a computer bureau in Bermuda.



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Rediffon branch in East Anglia

AN office to service Norfolk, Suffolk and Cambridgeshire has been opened by Rediffon Computers in Stowmarket, Ken Bowman, territory manager, will be in charge. The address is 37-39 Ipswich Street, Stowmarket, Suffolk IP14 1AH. Tel: 0452 8294.

At Rediffon's Crawley HQ, Andrew Roberts has joined as a product marketing specialist. His most recent job was that of sales executive with Olivetti. Philip Warner, lately a salesman with Adler, has become territory manager for the South-East branch with Rediffon, and will be based in Croydon.

Obituary

Eric Willis-Jones

THE death has occurred, at the age of 52, of Eric Willis-Jones, a member of the executive board of Thorn Electrical Industries and chairman of Thorn's industrial control engineering group.

He became head of the measurement, control and automation division after reorganisation of the Thorn Engineering Group in 1972, and was appointed to the executive board in 1973.

He was a past president of SIMA, a council member of BEAMA, CEMA and ECIF and a member of the EEF (London Association). He was currently serving on the NEDC Automation and Instrumentation Sector Working Party for the electronics industry.

Pay is the key to DP staff shortages

—SAYS LOCK GROUP SURVEY

FOLLOWING a rapid rise, there seems to have been "something of a brake" on salaries of DP personnel, according to the latest bi-annual salaries survey carried out by the Lock Management Personnel Group, of Guildford.

The survey, which covers the south and south-east of England (excluding central London) says that salaries increased in the 18 month period under review between 13% and 20% for most jobs with the more senior people receiving a higher percentage and exceptionally, the median salary of management services managers has gone up 38%.

Further observation is that "it appears companies are prepared to run their departments under strength rather than risk disrupting their salary structure."

The salary of the average analyst, programmer or operator has failed to keep pace with inflation, says the survey, and "until some relaxation (in pay restraints) occurs there will continue to be many unfilled vacancies."

Actual salary figures for the various DP job descriptions are based on data collected during March and April and are an amalgam of information provided by over 50 companies and the records of candidates registering with Lock Management Personnel Group regional offices.

At the bottom end of the programmer section, a trainee programmer aged 17-20 was earning between £2,250 to £3,250 while at the top, a systems programmer aged 20-35 was at £5,500 to £8,100.

An analyst/programmer (22-34) earned between £4,500 and £5,900 and a senior systems analyst (26-37) between £5,500 and £7,200.

In the management positions, a project leader (25-42) was earning between £4,500 and



MORRIS

CDC chief condemns 'predatory' takeovers

A NEW legal framework which would make it more difficult for contested takeover bids to succeed is being considered by a US Senate sub-committee.

William Morris, head of Control Data Corp., told the sub-committee that the capture of a firm by a richer one reduces employment levels, destroys job-creating resources and disrupts employee careers.

He suggested that shareholders in predatory companies should be required by law to vote on contested takeover bids. A social impact analysis of each takeover should be made before the acquisition was made, and a copy should be provided to any shareholder who requested it.

Earlier this year, Control Data shareholders agreed to an amendment in the company's articles of association designed to make it harder for CDC to be taken over (CW, May 18).

Canadian bureaux fear competition from the banks

CANADIAN computer bureaux are worried that proposed legislation there would allow banks to compete with them in providing data processing services. Proposed changes to the Bank Act are not specific enough in their stipulations, claims Derek Price, president of the Canadian Association of Data Processing Service Organisations.

Amendments to the Act as at present put, forward state that banks may provide "banking-related data processing services". This would be in line with a White Paper issued in August 1976 which expressed concern about possible unfair competition, concentration of economic power, and conflict of interest.

Adapso in the US is also concerned about competition from banks, and is suing a New York bank in a test case (CW, July 7).

NEWS IN BRIEF

Survey of DBMS users

A SURVEY of users' DBMS experience in the UK and Europe is to be conducted by the Butler Cox Foundation, the research association of Butler Cox & Partners. Based on a brief questionnaire with only eight questions, the survey aims to measure the success of DBMS implementation and the overall degree of user satisfaction.

Results are to be tabulated according to the DBMS product used. Questionnaires are currently being mailed to about 300 companies in the UK and Europe and firms wishing to ensure that they are included have been invited to contact Butler Cox & Partners.

Refurbishing

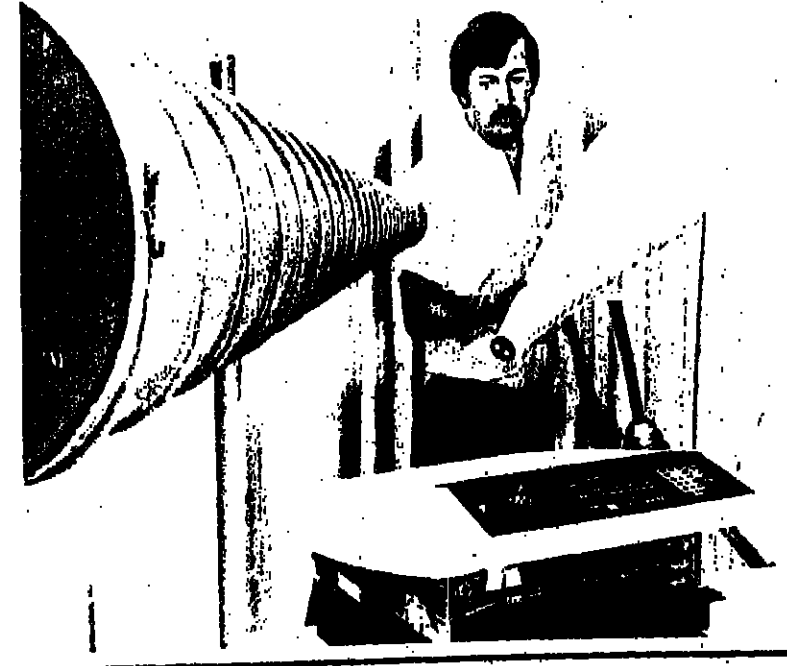
DISC drives and storage modules from most of the well known manufacturers can be refurbished and upgraded by Sinter Elinor of Reading, the UK representative of the US-based refurbishing specialist, Trans Datacorp. Sinter says that damaged or worn heads and modules can be refurbished at between 30 and 50% of the cost of new parts.

Sysline system

REPLACING a combination of bureau services and accounting machines, Needlers, the Hull-based confectionery manufacturer, has installed a Sysline 3000 system worth £40,000. It will handle order processing, sales, purchase ledger and nominal ledger applications for the company, which has a customer list of over 14,000.

Bugs in the system

These conical logarithmic spiral antennae are used to test the effectiveness of shields against radio interference. Originally developed for the military, they are now being used by Richard Hatz with a Honeywell Level 6 minicomputer at Honeywell's plant in Billerica, Massachusetts. The company also uses them with terminals, printers and mainframe components.



Word processing conference dates

ANOTHER conference on word processing will be held at the Regent Centre Hotel, London, on October 30 and 31. Organised by Information Studies, the meeting will be called "Word Processing — the Human Dimension" and will be aimed at current and potential managers of word processing systems, discussing the selection and use of equipment.

Several pundits well known from other conferences will speak, including ergonomist Tom Stewart from Loughborough University, and Peter Coen from Logica, North Barkley of BSI, Shirley Pickard of ICI, and Doris Lenson, formerly of the AA, will give first-hand experience of the introduction of WP in their organisations.

A newcomer to the WP scene will be union man Barrie Sherman, research director of ASTMS, who has gained a reputation in the computer world for forthright and intelligent views on labour matters.

He will talk about office automation and the unions.

Over the two days of the conference there will be round table discussions in addition to the formal sessions, to enable participants to air their own views and problems. They will be asked to complete a questionnaire before the conference to make their needs and expectations.

Attendance costs £225 plus VAT. Further information from Information Studies on Chislewood (08278) 4244.

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Computer shop to open in Luton

THE first week in September is the target opening date for a new personal computer shop for the northern home counties market. Though a lease has still to be signed on premises, the new shop, Isherwoods, based in Luton, will be selling a wide range of hardware from Commodore's Pet, up through the Apple II to the Sol and Cromeco systems, distributed in the UK by Comart.

Leading lights behind Isherwoods are Bob Crook, an ex-advertising executive who currently has his own company, RITE, selling programmable calculators and cost estimating packages to the printing industry, and Robin Woods who, until recently was personal computer product manager in UK for Texas Instruments, and now has formed his own company, Robin Woods Personal Computer Consultants. Crook and Woods have also formed a joint company, RITE Business Systems, which will

trade under the name Isherwoods.

In addition to the hardware, which will range in price from the Pet at £895, through to systems costing around £10,000, Isherwoods will have a strong bias towards the development of packaged software for business and professional applications. Crook indicated that several software consultants were currently working on specific projects, such as stock control and payroll packages, and said that the objective was to have them available off the shelf, and at low cost.

Despite this bias, the shop will be selling equipment right across the market spectrum, including the hobbyist and home user. Stocking orders have already been placed with Commodore, for the Pet, Personal Computers for the Apple, Comint for the Sol, and for North Star and Cromeco lines.

Texas: Three markets

AS the ex-product marketing manager of personal computers for Texas Instruments, Robin Woods has an intimate knowledge of the company's thinking in this area, and is keen to see the planned systems being sold through the new shop.

According to Woods, the projected TI range of hardware is due to be launched, at the latest, by the end of this year, with autumn the most likely time.

From a variety of published data from the company, he says, it is possible to deduce that three distinct markets have been identified, and that the company is probably planning to introduce

different machines in each sector. The first is the professional market, which is seen as requiring flexible programming and a high order of computational ability.

The second market is the small commercial business system. Here, the computational requirements are low, but the system will require excellent operating software to handle large data bases with ease.

The third market sector is the home, and according to Woods, TI's thinking here is for a £200 to £500 system suitable for such applications as domestic cash flow, tax planning, and insurance inventories.

Mostek set to market 32K hybrid RAMs

FOLLOWING the move by IBM to buy 4K static RAMs from Intel (CW, July 13), and the conjecture that the same would soon be happening in 16K dynamic devices, with two chips mounted together to form a 32K hybrid, one of the contenders for this upcoming IBM order is now set to launch the product on the open market.

That contender is Mostek, which according to US sources, has already lost out in the IBM race to Intel and Texas Instruments, so the company now plans to sell its hybrid memory. Dietrich Erdmann, European vice-president of Mostek, confirmed last week that the memory has been produced, but said that there are no sales or marketing plans for it, and no pricing structure as yet. There are indications, however, that it is already being mentioned to some European customers.

The device itself consists of two 16K dynamic RAM chips mounted side by side in an 18-pin dual-in-line package.

This design was hoped to meet IBM's requirement for a "doubled-up" hybrid memory package, and followed a pattern set by Mostek last year, with a side-by-side configuration using 4K devices. This was originally developed to meet a specific customer requirement, and was later made available on the open market.

IBM, which favours such

hybrid constructions, already uses 2K devices of its own manufacture in packages that contain 4 chips, giving an 8K RAM.

Both Intel and Texas Instruments have gone for the alternative solution of stacking the 16K chips, one on top of the other in an 18-pin package. This is favoured by IBM, and has been christened the IBM "Love bug" by the industry.

At first sight, this move by Mostek seems a little strange, for several reasons. First and foremost, it puts the company in a somewhat isolated position in the market, in that it seems to be the only memory maker prepared to introduce a 32K bit part.

The second important consideration is that, historically, memory components with capacities that are not even number powers of two have

never been successful. The 32K part (32,768 bits) is 2¹⁵.

This is borne out by the relative failure in the market of 512-bit, 2K and 8K RAMs, as opposed to the 1K, 4K and 16K.

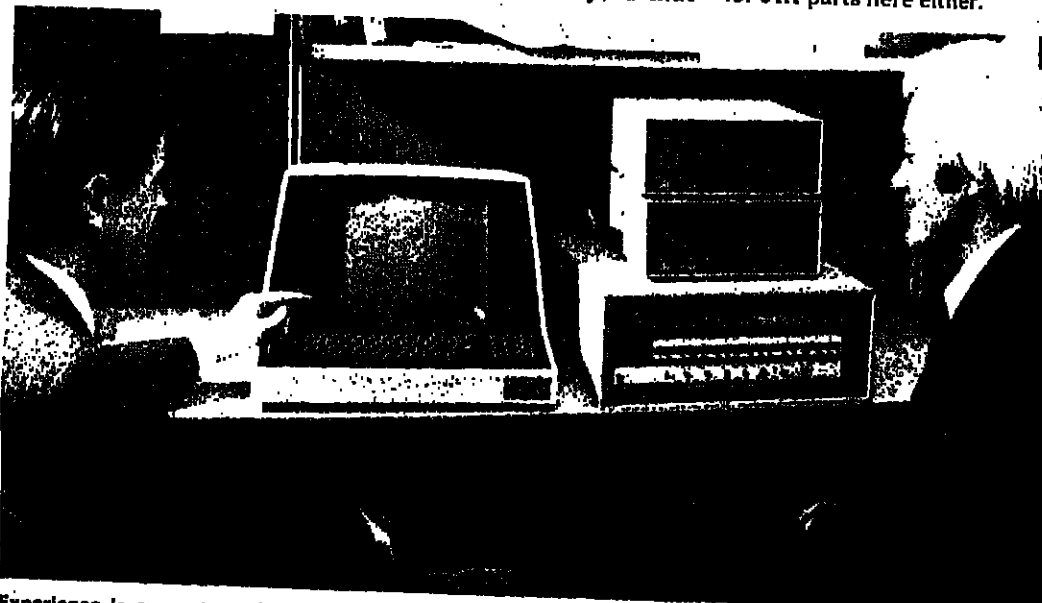
On the plus side, however, is the fact that even though IBM has chosen the 32K size only for internal use, it is big enough to make it a de facto standard. On top of this is that by using existing devices, albeit in a non-standard package, Mostek will provide an effective means of increasing memory capacity at low cost. And unlike IBM's 2K/8K configuration, which did not take off in the marketplace, this new memory could well do so, if only because IBM is obliged to buy the devices on the open market, rather than manufacture them internally.

One final factor in its favour, a point related to its low cost and imminent availability, is that

there are hints of doubts appearing about the market prospects for a memory as big as 64K, a subject now close to the heart of the UK government.

With the majority of microprocessor devices and applications to be found outside the DP industry, it is interesting to note that a market survey, attributed to National Semiconductor, suggests that the average read/write memory requirement in such applications is 128 bytes. From this it is possible to see that a 64K RAM would be something of an overkill, and during its early days, an expensive one at that.

If IBM, still "the" computer manufacturer, favours 32K as a memory size, it is possible that many of its competitors may start feeling the same way. Should that happen, then there might not be much of a market for 64K parts here either.



Experience is a great teacher, as the staff at B18 Applied Systems are finding out. This Altair 8800B system, pictured above, which is used for basic research, as well as demonstrations on public courses run by the company, is also being used by the B18 staff as a tool for self-learning.

The aim, according to B18 director Garfield Collins, is to help the staff assess the place of the micro in

business organisations. One particular area where this learning is being applied is in distributed intelligence.

B18 has developed a pre-processor to produce a source program from keywords in the B18 structured programming design language. From this, the pre-processor can produce a compact Basic object code, which the Altair's Basic Interpreter executes at run time.

Now Intel plans its assault on the next 10 years

WITH 10 years of operation behind it, Intel is now gearing itself for an assault on the next 10 years of development in microelectronics.

Speaking last week at an anniversary luncheon in London, Tom Lawrence, vice-president and director of operations for Intel in Europe, pointed to several areas where he thought "such innovation would come."

While declining to confirm that "his" thoughts were representative of committed research programmes within the company, Lawrence suggested that one of the next big developments would be in dynamic reprogrammable architecture in microcomputing.

This, he felt, would involve the development of microprocessors that would adapt their architecture to suit the particular task required to be performed. Where this would be most relevant would be in dispersed multiple microcomputer systems; an approach to computer construction that could supersede the mainframe computer, as it is currently conceived.

Such microprogrammed adaptive control would allow this type of system to reconfig-

ure itself to the needs of the task at hand. If, for example, the task called for a single 32-bit "number cruncher" then the system would configure itself as such a machine. If the next task required several 8-bit machines, preferably working in parallel, then that is what the machine would become.

The company also sees considerable importance in the future potential of the telephone and television as input/output tools.

While keen to maintain its position of market leadership in the microprocessor business, Lawrence indicated Intel's awareness of the change in market and product emphasis that the next 10 years will bring.

The company's first 10 years had been largely in the replacement products market, with dynamic random access memory replacing core, and microprocessors replacing random logic devices. While future sales in these areas would continue strongly, future product developments would be innovations and, therefore, without such easily definable market potential.

Ulster puts £75,000 into micro firm

FOLLOWING the lead set by the Department of Industry and the National Enterprise Board in funding advanced technology microelectronics, the Northern Ireland Development Agency has also got into the act, with the provision of £75,000 for a new company, Power Automation Products, to manufacture a microcomputer system.

The company has already been operating in Canada for a while, with a Northern Ireland head man, John Cunningham, at its head. It has acted as a marketing company for the system, which has been developed and manufactured by a Lisburn-based company, Medical and Scientific Computer Services.

The plan is now for PAP to take over manufacture with Development Agency backing, a move that should create initially about 25 new jobs in the area.

The system itself is essentially a sophisticated monitor for public utility power transmission systems. Based on a Motorola 6800, it monitors the power lines and when a fault is detected, stores for later analysis the wave form of the transmission prior to, and immediately after, the fault occurs.

It has already been sold on the North American market, and PAP plans to expand sales into South America and Europe.

PERSONAL COMPUTING

To some extent, the Personal Computer has become the most accessible guise for the population to latch on to the microprocessor. In as much as any member of the public can understand the workings of computers, it is easiest for them to relate to the import-

ance of the decreasing size of computing capability through a small, desk top system that can claim to be a "real" computer. But even so, there are misconceptions. Usually, personal computing equipment is referred to as hobbyist, with all the conno-

tations of midnight soldering by wild-haired "professors." Certainly, some of the personal computing equipment that is now available on the market falls squarely into that category, but much of it does not. This widens considerably the size and

scope of the market for such equipment, both now and into the future. Yet because the market, and the industry making and selling the equipment, is still relatively new, little has yet been discovered about its size and scope.

Applications that range well beyond the home and hobbyist

THE fact that new companies in the personal computing field are being formed almost weekly is sufficient evidence on the surface that a market for such equipment exists in this country. The size, scope and major sectors of that market, however, have been harder to isolate and quantify in the past.

That is why a small survey of the industry was undertaken, to try and establish some basic facts and figures. The survey was undertaken on the basis of the industry's own views of the market and its movements.

The most important fact to be established, silly as it may seem, was that the market for personal computer hardware existed at all. Even so, at a total estimated value of £5.5 million this year, it is by no means large.

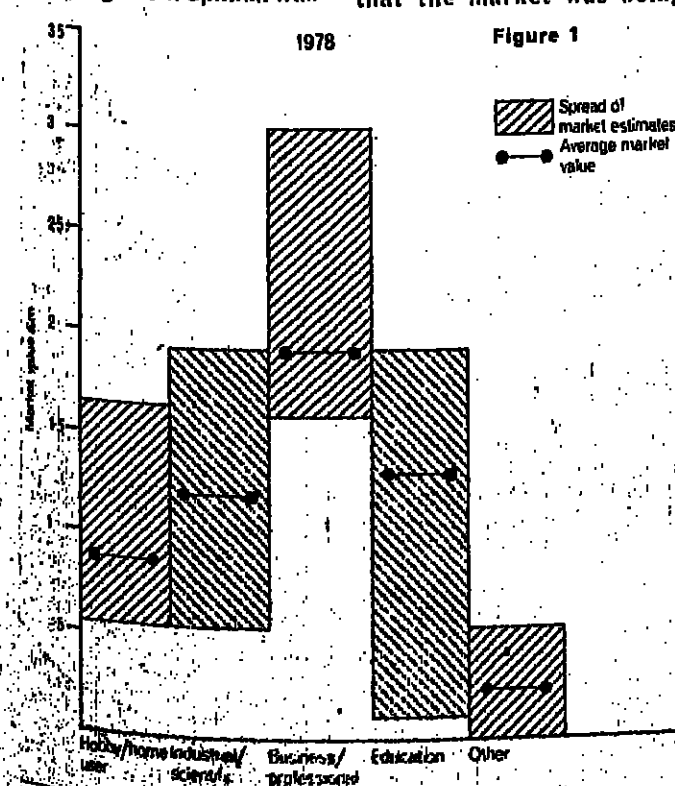
The industry that makes and sells the equipment, however, is confident of the future, for in two years time a growth of 682% in the market is predicted, bringing it up to £37.5 million.

Personal computers are already finding a wide range of applications that range well beyond the home and the hobbyist, so five main sectors were selected to point to the main areas where the equipment is used.

The first was the hobbyist/leisure market; this was followed by the industrial/scientific market, the business/professional market, education, and what was a catch penny for the many esoteric applications that are being tried at present.

As the industry is still young, it was to be expected that the opinions of the industry would vary considerably. That this was so can be seen from the survey charts.

The divergence of opinion was



extraordinarily slow to take off. This was put down to be the fault of both the sellers, in terms of pricing and approach to the market, and the perhaps natural reticence of the potential buyers in purchasing new equipment. But even if some of the in-

dustry thinks this growth rate is slow, it is undoubtedly a rate that will cause considerable problems for many of the companies operating in the business.

There will be many organisational problems to be overcome to keep pace with the market, and as the numbers increase of users, with no previous electronics or computer experience, the total cost of "servicing" those customers will grow in importance.

This will come as education as part of the sales cost, and in back-up service and maintenance. Even if this is maintenance by replacement, it will be expensive, and it is possible to predict that some of the current companies in the field, both selling and manufacturing, will drop by the wayside by 1980.

Of the five selected areas, the largest is the business/professional sector both for this year and 1980. This is followed by education, industrial by education, user, and "other" sectors (see Figures 1 and 2).

This year, the average percentage share of the personal computer market taken up by business/professional applications is estimated by the industry at 35%, or nearly £2 million.

Opinions varied within the sample, ranging from 20% to 55%, but the majority plumped for something over 30% for this sector. It is interesting to point out that the respondent that suggested a 20% market share for business applications, also suggested a total market of £10 million, still giving a value for the sector of £2 million.

By 1980, the sample predicts that the business/professional sector will take an even bigger slice of the greatly expanding market. The average estimate is 40.3% of the total market, with the variance ranging from 30%

to 60%. In value terms, this is a range between £11.25 and £22.5 million.

Education, the next biggest sector, has an average estimated share of 23.66% for the current year. There was perhaps the biggest difference in opinion for

this sector, which could partly be accounted for by different companies individual success (or lack of it) in selling to educational authorities and partly by different regional attitudes to computing and computing equipment among the educational authorities. The lowest figure for the sector was 2%, while the highest was 35%.

To some extent the inevitable delays by educational authorities in placing any orders for such equipment has been a hindrance on the potential of this sector.

As one industry member put it "if teachers had their own way, the educational sector could take well over £1 million this year". At 35% share however, other opinions indicated that they felt it would take that anyway.

As the decisions by educational authorities are made over the next two years, this sector could acquire a total value of around £3 million. The average estimated percentage share for education in 1980 will basically remain steady, dipping only slightly to 23.33% of the total market.

Again, the difference of opinion is marked, with the lowest estimate for the sector being 10%, under £4 million, while the highest was 40%, almost equal to the business/professional market.

One of the biggest surprises was the strength seen for the industrial/scientific market for personal computers. While much has been written about the impact of the microprocessor in the industrial field, this has generally been expected to be in the form of dedicated systems designed for particular applications, such as machine and process control.

While that may be the long term future for the sector, it is currently absorbing a reasonable slice of the total personal

computer output in this country. Several companies within the sample expressed surprise at the existence of this sector in the market, and were exploiting it with glee.

For many, it is a sector that was not considered viable, until it started making approaches to the industry.

Commodore, for example, chose to use the IEEE-488 standard interface with its Pet system, rather than S-100 or any other interface. This standard interface is however, the one used by electronic instrument manufacturers to connect different instruments together.

Such instrument, connected to a computer system, produces an automatic test system that can be changed to suit different requirements by changing the instruments used in the test

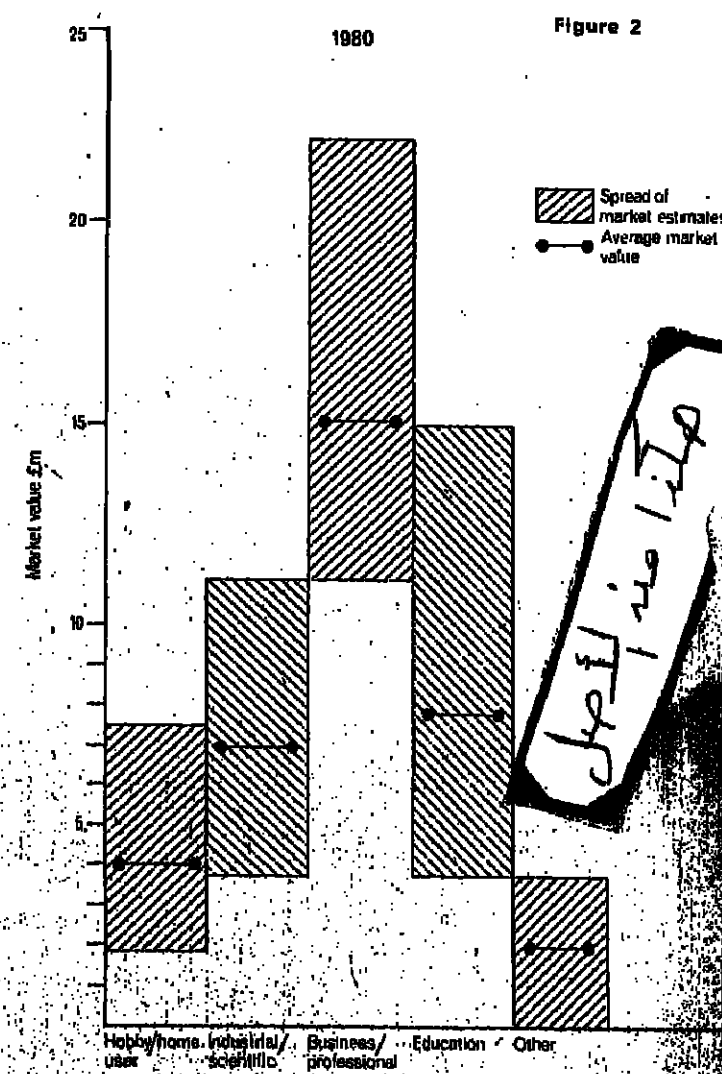
procedure, and the computer program controlling them. By choosing this interface, the Pet can be used in place of the previous minicomputer hardware directly.

This is just one of the many examples of the use of personal computers in an area that would not normally be considered as a prime market.

This year, the average estimate of the percentage share of the total market taken up by the industrial/scientific sector is 21.83% — around £12 million — while the spread of opinion ranged from 10% to 35%. All companies within the sample, found this sector very visible.

By 1980, the sector is still going to be an important part of the market, with the average

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Low-cost packages the key

THIS, to some extent, is survey of the personal computer business in the UK — Part Two, for as part of the questioning of the industry sample that resulted in the marketing statistics that appear overleaf, questions were posed about the future, and the product developments that were felt most likely to appear.

While there were several different ideas about what might happen in terms of system hardware, the samples were of one accord when it came to software.

Within the next two years, in their opinion, there will develop a tremendous market for packaged software that should be both inexpensive and easy to use, and that enormous potential exists for a new group of entrepreneurs to come into the business to write this software.

Although there were degrees of opinion within this consensus view, every manufacturer and supplier of personal computer equipment contacted, predicted that packaged software would be a market of tremendous value, and several indicated that it would probably be one of the key factors in the development and growth of the total market.

The prime reason behind this thinking is that the current market consists mainly of customers that have some knowledge of computers and computing, either directly or through some indirect contact like a relative or friend who has some experience.

There is, however, a very definite limit to the number of people in the country that currently fall into that category and there is, therefore, a potential limit to the growth of the total

market.

By and large, the present market customers have sufficient skill to solve their own programming problems, though this may well be assisted by help through one of the many user groups and clubs that are springing up.

For those without the necessary experience, the only solution to the problems of developing suitable software to complete a system, especially where such software is required in a business or other productive application, is to go to a software or systems house and have the programs written specially. This will usually achieve the

small businesses in the UK, and even a mere 10% of that still represents a sizeable potential market for both hardware and software systems, if it can be tapped.

So what does the industry feel is required? The first consideration is that the majority mentioned was cost. The upper limit on the price of individual applications programs was £25, and some said a figure lower.

Each program should contain the basic structure necessary to perform the task required of it, for example a payroll package for up to 25 employees, but several companies suggested that there might well be a

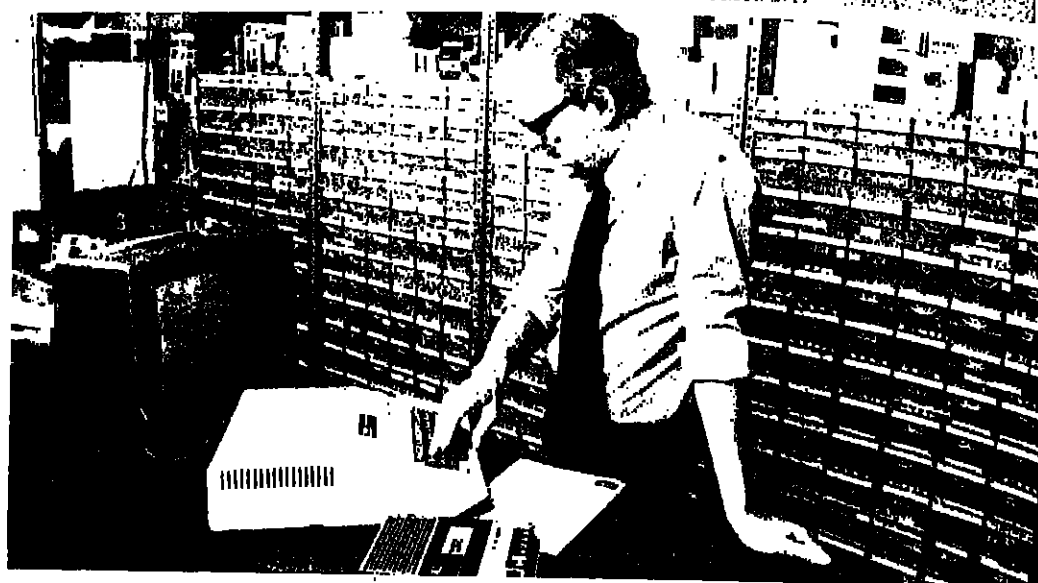
Whatever happens to the hardware of personal computer systems over the next two years, the big development seen by the industry is packaged software. Inexpensive applications pack-

ages that require the minimum of tailoring to meet individual customers requirements are seen by many in the industry as one of the key factors in spurring the growth in the market for

objective extremely well, but the cost can be prohibitive, more than doubling the purchase price of even the most expensive personal computers, in many cases.

While this can be justified by the bigger businesses on a number of grounds, ranging from a sizeable saving in alternative operating costs, to the development of systems for long term future use in several business areas, the vast majority of potential users cannot stretch their resources to cover such investments.

This is why the personal computer business feels that the potential for inexperienced packaged software is so big. According to some statistics, there are around 1.5 million



The Apple II computer, seen here working in an inventory application, is now to be manufactured under licence in the UK by ITT, the US giant that recently started a marketing operation on the system. The existing industry suggests that within two years, there could be a big "name" company emerging through the others in the market.

new generation of personal computer users will not know, and will not want to know, about the intricacies of computer systems and programs.

The need will be for program packages that are loaded reliably with the proverbial "touch of a button," and subsequently do the required task, not so much efficiently, but with the minimum of fuss.

In relation to program efficiency, the majority of the sample seemed to feel that Basic would remain the top language of personal computing, despite the growth of Cobol, Fortran and Pascal in forms suitable for micro-based equipment.

These packages are, however, not yet with us, and one of the prime reasons is that there is currently nobody around writing them.

Some felt that the market was becoming oversaturated with new to the fact that Basic was now well established in personal computing. As each user usually has a one-to-one relationship with a computer system at this level, the fact that Basic is an inefficient language

of little relevance. Within all this euphoria, however, there lies the realisation that such potentially explosive growth in a new market for software products will almost inevitably attract some "cow-

boys." Several companies within the industry said that there is already a need for some form of standardisation to be laid down if software packages are to be

that it is always available as part of the system's hardware.

This has already been done in some systems, by using several small capacity devices. It is now possible using just one large memory component.

Added to this is the distinct probability that the more common applications packages will also be available in this form. The main hindrance against this has so far been the fact that most microprocessors do not operate using position independent code, so that memory boards holding applications firmware are a complex engineering task. But recent additions to the roster of available devices, such as Intel's 8086 and Motorola's 6809, do work in such a way.

It should therefore be possible to purchase chips from a retail shop, place them anywhere within reason on a printed circuit board, and build a system.

with language interpreter and application packages with considerable ease.

This is obviously an area of the market that the semiconductor manufacturing companies would be pleased to see develop. They are, after all, in the business of selling their products in high volume, and this is an area where such volume could exist. If firmware packages became readily available, it is certain that the pricing of them would soon become extremely attractive.

Though the sample was of one opinion in software, there were several different views expressed about possible hardware developments over the next couple of years.

One suggestion is of particular importance, to both future customers and the manufacturers and suppliers already in the business. This is that a "name" company will come to the fore during the next two years, and will become firmly entrenched as the market leader in hardware — and possibly software as well.

As to which company that might be, there were no suggestions, but recent developments indicate two possible contenders. Following its move into the market with Apple II systems, the announcement by ITT that it is to manufacture the hardware under licence is a clear indication of the company's intentions.

There is also the oft-mentioned entry by Texas Instruments, which now seems to be forming its plans along the lines of a range of hardware that will cover professional, commercial and domestic market areas.

Other giant companies, such as IBM, are rumoured to be looking at the market closely. The "name" will probably come from one of these.

Beyond home and hobbyist

From page 13

estimate being slightly down, at 18.33%. The degree of variance reduced slightly, to rest between 10% to 30%, giving a 1980 market value that should lie somewhere between £1 million and £11 million.

As for the genuine hobbyist and home user, who buys a personal computer for personal edification, amusement, or pure swank, they take only a small share of the total market.

The highest estimate for 1978, is 30% of the total market, while the lowest is around the 5% mark. The average estimate, at 18% of the total market, puts a 1978 total value of the sector of only £220,000.

By 1980, the percentage share will drop below even this figure, so the industry thinks. The average estimate is 10.33% of the total market, and while one estimate suggested a 20% share for hobbyists, others put the share as low as 5%. This gives a projected total value for the sector

that will lie somewhere between £2 million and £7.5 million.

The final category in the survey, the purposefully undefined "other", has been used as a depository of all the purchasers and applications the industry has encountered that did not fit neatly into one of the more specific categories.

Into this catch-penny slot, however, the sample surveyed placed a total of nearly £250,000 worth of business as the estimate for this year, the average estimate of the total market being 4.5%. While the lowest share attributed to it for this year was zero, some suggested that it could take as much as 10% of the total market.

By 1980, the sample expects to see this sector actually expand up to an average estimated share of 5.33%. Again, the variance in opinion ranged between 0 and 10%, but the expectation is that some £2 million worth of business will be generated by this sector.

Useful techniques for distribution of software

THE personal computing phenomenon has expanded the horizon for packaged software to the point where virtually any computer user can distribute software, if he so desires.

Much consideration should be given to the various media available and their suitability to the particular product; after all, you wouldn't serve Mouton Rothschild from a milk bottle; conversely, you wouldn't sell lemonade in crystal decanters.

The prime question a potential distributor should ask himself is "Who am I aiming at?" This will cover such factors as home/business users, high/low volume sales, important attached to capital investment and performance requirements.

The answer to this fundamental question obviously affects the package development, but often ignored is its effect on marketing. This oversight may have fatal consequences to the company concerned, as lack of foresight in marketing may lead to an unsaleable product.

The selection of distribution medium should be anything but the lottery it frequently is; serious consideration would be given to alternative media available even when this entails capital investment.

The three most important media currently available are cassette deck, the floppy disc and the programmable read-only memory. Also worth consideration are paper tape, though now declining in most fields, and telecommunication systems, such as videodata and computer networks.

Cassette based systems have a wide user base in the personal computing sector of the market. They have the distinct advantage of being cheap and widely available, and the cassettes themselves are generally robust, easy to store and re-useable.

However, cost advantages must be offset against reliability and speed, and it is generally true that you get what you pay for. Unfortunately, a wide range of recording standards exist, and, for mass-market distribution, this may require a large capital investment to cover all of the market.

While they are reasonably efficient for handling of sequential data, such as program loads, they are very inefficient where random access is required. Error rates depend largely on the quality of tape and deck used in the system, although sophisticated interfacing techniques may improve this. The capacity of a cassette depends on the length of the tape, ie C30, C60, etc., and on the recording standard employed. Typically, it ranges from 10K to 100K on a C30 tape.

Floppy disc based systems span the range from the top end of the personal market to sophisticated microcomputer development systems. They are usually associated with a filing or operating system and the capital investment ranges from £100 to £2,000; although this should decrease with the advent of single-chip controllers.

In common with cassettes, there are a number of standards, and similar problems exist. Random access is relatively fast, and the transfer rate is typically 500K bytes per second. Memory access which is the transfer rates of up to 100K bytes per second.

cost about £4 each and can hold 256 K bytes of data. They can be easily damaged by a careless operator, but are durable with careful handling and have a low error rate.

The discs are sometimes faulty on delivery, but manufacturers are normally co-operative over replacing them. Ordered storage of discs is easy to achieve. Discs can be re-used, and they can also be physically write-protected.

PROMs differ from the magnetic media in that they are usually built into the target computer and are usually executable programs such as monitors, compilers and video drivers. They are generally used only for special applications, and are usually as fast as the host microprocessor. They are very reliable and durable once installed, but require specialist handling during installation.

PROMs are not re-useable unless they are of the erasable variety, which is slower and more expensive. To program PROMs a special programmer is required. This costs in the region of £1,000 to £2,000, but will only be required by the distributor. Suppliers of PROMs may offer programming facilities, but in the long run this may work out

more expensive. In either case, PROMs are an expensive way of distributing software since they cost about £4 per K byte, plus programming and installation costs.

Telecommunication systems are a relatively new and unproven method of distributing software to a wide market. However, with the dramatic fall in modems and interfacing costs, it is becoming apparent that the current low volume of traffic will increase, especially as the international market opens to any network user.

The problems of charging have yet to be resolved, hence no realistic comparison as yet can be drawn. However, firms will be well advised to keep abreast of developments in this field.

Paper tape, contrary to popular belief, is still in fairly widespread use and affords a cheap method of data entry to almost any system. Furthermore, source programs can be distributed at very low cost without the need for a computer since they can be copied on an ASR 33 teletype. It is popular in the personal market since second-hand paper tape readers can be obtained for about £40. It has few advantages not matched by cassette drives, and is both non-reusable and fragile in use.

Other methods of program distribution include bar codes, source listings and hexadecimal listings. These are largely published in hobby magazines and revenue is collected from the publisher rather than the end user.

Having chosen the distribution medium or media, it is then appropriate to consider how much of the potential product is to be distributed. There are broadly three levels of distribution: 1 Executable code and operating instructions only; 2 The above plus some internal details allowing modifications or enhancements to be made; 3 Full documentation including source code.

The first and lowest level option is the easiest to administer, and it is also the cheapest to the user. This is the solution most commonly adopted. However, for various reasons, notably

games programs, and where non-standard devices may be used in a system, one of the other solutions may be appropriate. The decision taken at this point may make it necessary to revise the decisions as to media. The two should thus be seen in conjunction with each other and additionally with the question of product maintenance.

There are two main classes of software maintenance: bug correction and product updates. Bugs will always occur in software and this should be taken into account when pricing.

For the bulk of applications, bugs will slip through the net of

the tester only to be caught by the irate user. When the fix required is found, it may be provided either by the user himself or the distributor.

In the latter case some form of pricing must be applied. This may be included in the original purchase price or as a maintenance agreement.

Once a correction to a bug has been found, there is still the problem of distribution among affected users. This can be done in three stages:

1 Issue a patch. This will usually be in the form of a written notice accompanied by a listing. The user then enters the

patch on his own system, but this method is not usually applicable to PROMs.

2 Exchange media. This can be done by returning the original media for replacement programming or by supplying a blank which the distributor programs. This works for all the media considered and is especially cost-effective for fast reusable media.

3 New releases of software. These are not generally done for bugs alone, unless they are crucial. They may also incorporate software enhancements or modifications forced by legislation, eg VAT and tax rates, etc.

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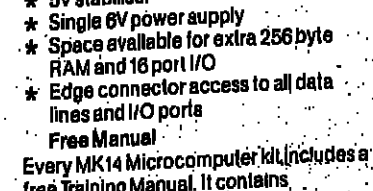
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One of the major problems facing computing service companies is the acute shortage of skilled staff. Although this shortage might seem to be of great benefit to staff already in the computing busi-

ness, as it offers a large pool of interesting vacancies, in the long run the present situation could be damaging both to employee and employer. In this article, ALAN BEN-

JAMIN (pictured right), director-general of the computing Services Association, analyses the problems and provides some practical suggestions for improving and stabilising the job market.

Communications is the key to stabilising the job market



RECENTLY, I have been in discussions with CSA member companies and some of their employees about the difficult situation which now exists as a result of the staff shortage. As always, there are two sides to any story, and since the chaotic state of the job market in computing, in my view, helps no one in the long run, I shall try to persuade readers that now is a time for both employers and employees to stop and think about jobs in our industry.

Many factors are conspiring to make conditions for seeking and finding computing staff extremely difficult, if not impossible. Firstly, the education and training system failed lamentably to invest in data processing courses, methods and techniques *par* and as part of other disciplines.

Worst in this area of failure was the neglect in producing qualified people to teach the application of computing. The result of this has been that the pool of people entering the industry has been too small and there is still widespread misunderstanding.

Then the computing industry, with some exceptions, failed to create and maintain formal intake programmes of graduate, professional and school-leaving personnel. Therefore no momentum was created for a constant stream of people to enter the industry. This was compounded by the 1971 recession when computing companies at best stopped recruiting, and at worst laid off (about small) numbers of employees. This interrupted the small flow of entrants to the industry.

Since 1972 there has been a sustained growth of computing by users and in the services industry. This was spurred on after 1973 with the availability of lower cost minis and again by developments in data communications.

Competition for staff — especially skilled and experienced staff — grew in intensity, and the activities of the specialist recruitment companies, which were able to present job opportunities so much more effectively, increased the demand. Finally, as with any skill shortage, the pay policy with its rigorous criteria for increases ensured that the only way for many computer staff to gain useful increases in salary was to move jobs.

This condition is still with us today. So are the requirements of the Price Commission with regard to the admissibility of pay increases to sustain increases in charges.

In short, conditions could not have been designed better to produce a shortage of skills, competition for those skills and the constraints upon computing utilisation and growth that this shortage now imposes. And imposes at a time when Britain is poised for its biggest leap forward in the technology for years with profound implications for the economy and the restructuring of the manufacturing process because of the microprocessor revolution.

There is always a moment when, in the headlong rush for growth and development, it is wise to pause and ask questions about the means as well as the ends. In the case we are discussing the constant enlargement of skilled and experienced staff brings only lasting benefits to the inland Revenue.

Pay increases achieved by moving job frequently do, of course, leave their recipient with the after tax increase, but what else?

Before looking at both sides of the equation, let me point out that I am really talking about a balance between the present needs in the computing labour

market and the mobility which is a necessary condition for growth, technology transfer and entrepreneurial activity.

Taking the employee's viewpoint first, I readily accept and encourage anyone's right to improve their position in life. Faced as he, or she, is with inflation, high taxation and until very recently with an economy above all running out of hope, it is not surprising that employees seek salary increases with great energy. The social legislation which has come on to the statute book has created an environment for shortages of skills to be exploited.

Many factors are conspiring to make conditions for seeking and finding computing staff extremely difficult, if not impossible.

Again, the employee in computing cannot yet see clear career paths either in his own sector of operations or in a recognition of his skills by general management. This is much less true in the computing services industry, which has developed these conditions, and one reason why a period of employment in the services sector is so attractive. By and large computing employees do not enjoy excessive fringe benefits receiving much the same by way of compensation packages as employees in other industries. On the other hand he is in demand and, faced with an employer who abides by the pay policy, compares the 10% increase in pay (8% after tax) with up to 25% which he may get by responding to the advertised offers for jobs which he apparently can fill.

Well, there are some other considerations. His reputation, built at least in part on his achievements which must be referenced. A curriculum vitae which reveals three or four jobs in say, two years, suggests that the owner has not had time to time scale. Or alternatively, he has been so successful that he has not been completely satisfied. Or that there has been no time for performance evaluation and appraisal, leading to promotion. These are noticeable gaps and a careful employer will observe these factors.

Job satisfaction derives in part from contributing to the progress of the organisation for which one works, as well as relating to the technical challenge and content of the work as a whole. This requires some sort of recognition and reward system which is not a mere monetary incentive. It is a balance between the present needs in the computing labour

promotions and completed project references are a sound background from which to progress.

If all computing employees were to remain with an organisation for three years — an impossible condition — the skill shortage would transpire itself into a manpower shortage which, with the right entry policies, could be solved within a few years.

The employee should also consider the non-salary conditions which apply to his job and examine very closely the comparative conditions which are attached to a job-hop salary increase. Is the pension contributory? Is it indexed? What are the health and medical insurances and are they as comprehensive? What about holidays, working conditions, promotion and the project beyond the one for which his services are sought?

Some thought should be given by the employee who contemplates a move, to promotion and organisational comfort. An objective analysis of his achievements in his present job is useful. Are they identifiable and can they be referenced? Is he comfortable organisationally? That is, are his responsibilities, both for projects or people, within his range of experience and competence and is he stretched? In any move, he identifies how his organisational position will align itself with his style or expectation?

I am sure that many people who move jobs do give considerable thought to these matters, but I have seen evidence that many do not. And many people move without a preliminary discussion with their present management about their changing needs. I have found that where this does happen (invariably in the better managed companies) ways and means are found for needs to be satisfied. Comparisons of new appointments, changing responsibilities, travel or other just better communications, can which must in some measure benefit both parties and that is continuity.

What brings me to another old-fashioned word, loyalty. We put people are loyal to their profession and not their employer. This reaches its extreme in the US, where large Federal contracts are renewed on open tender. If the incumbent company loses to a competitor, the entire resource, people, machines, everything, leaves. No one has quite worked out what happens when the corporate terminations altogether.

More often, however, the loyal employee asks, 'Why pay? Well, one thing is true, your employer will have to earn your loyalty, and he will have to give you reason for his pride

in being a member of his company. But if he does, do you respond? How can you demonstrate this quality? One way is continuity of employment, riding with the company through good and bad times, and if you are keen to move for the best of reasons, then do so from a standpoint which includes the convenience, or at least the minimum disturbance to, your current employer.

Finally, another question which might be asked more often is, 'Will this be a better company if I stay?' Sometimes people, both employers and managers as well as employees, need to surmount career thresholds and personal hurdles which appear from time to time and staying may provide answers which are as successful as leaving.

A last thought for the employee is that he should take care not to price himself out of the market. If he becomes too expensive his yield will drop.

Now, from the employer's viewpoint, simply to reverse the coin on the above discussion is not enough. It is a genuinely complex task to cope managerially with a burgeoning industry which embraces technology with a high rate of change and a critical shortage of skills. It is only now that senior management in the computing services industry has reached an age and has earned enough experience to begin to develop techniques of communications which will enhance the stability of the labour scene.

A curriculum vitae which reveals three or four jobs in say two years, suggests that the owner has not had time to deliver proven work over any timescale.

Managing computing professionals, who are articulate, well educated, positive and young, in a social environment where participation, consultation and decision sharing are the props to any discussion about employment, has not proved easy. Indeed, despite this, the progress has been remarkable so far. Some computing service employers, conscious of the need to give example and to maintain financial stability take a puritan view of things and let all the time they will face a threshold in their growth when priorities change and the need to communicate with colleagues is greater than a few hundred pounds per week in fees. But if employers want more stability in the labour market

and wish to reduce the cost of recruitment, then it must be worthwhile finding those issues which give rise to labour turnover with all the disruption which ensues, and concentrating management attention upon them.

If we take pay policy as one difficult area, it is clear that CSA members, for example, prefer to honour the national commitment. The difficulties of contractual performance for example, in government-based contracts, added to Price Commission requirements, are just two reasons. Many see the need, however, for some cost restraint and, therefore, pay restraint, in sheer management terms.

Employers faced with recruiting new employees, whose skills are no better than existing employees but whose salary demands are much higher, face an almost impossible problem. Perhaps many systems of results-based remuneration or profit sharing should operate. The dangers of this approach are well known and the interdependence of employees in the computing industry is as marked as elsewhere.

There is merit, however, in strengthening communications with employees, about the value of their benefits, about organisational strategy and about company objectives, etc, so that pay becomes one of only a number of factors governing the employer/employee relationship.

Employers who take visible steps to recruit 'at the bottom' that is to bring in trainees and grow them, usually command more respect from existing employees. One CSA member, a small software house, takes one

graduate a year from his local polytechnic, and it is one of the most sought after jobs, according to the local head of department. This year, he will take two and, in the five years since he started, all the graduates are still there, with two of them in management jobs.

Communications is the most important factor in my view which concerns the stabilising of the computing job market. Stabilising does not mean making rigid. It means that the kind of mobility which takes place is healthy, reasoned and above all is not one-dimensional. For this to happen, communications must be good with employees, with government in relation to policies which affect companies, and with colleagues, for example with fellow CSA members, so that common problems and approaches can be discussed.

This is not the place for a discussion on techniques of communications but only a place to emphasise to employers in the computing industry that if they succeed with communications they will almost certainly succeed with all else.

It is time to stop and think about jobs in computing, time for people to pause and think about whether the frenzied movement, taking place at the moment cannot be calmed to a combination of higher productivity and improved communications. Changing one's job for the best reasons will contribute to growth, also building new entrants will contribute to growth and growth to employment, profits and more opportunities.

It is a difficult balance to get right, but it is worth the try.

Intelligent copiers

From front page laser or optically from the face of a screen. Then copies are made from the drum electrostatically in the same way as an ordinary office copier works. The light changes the electrostatic charge on the drum, black powder or 'toner' is picked up by the charge and the toner is then transferred to the paper.

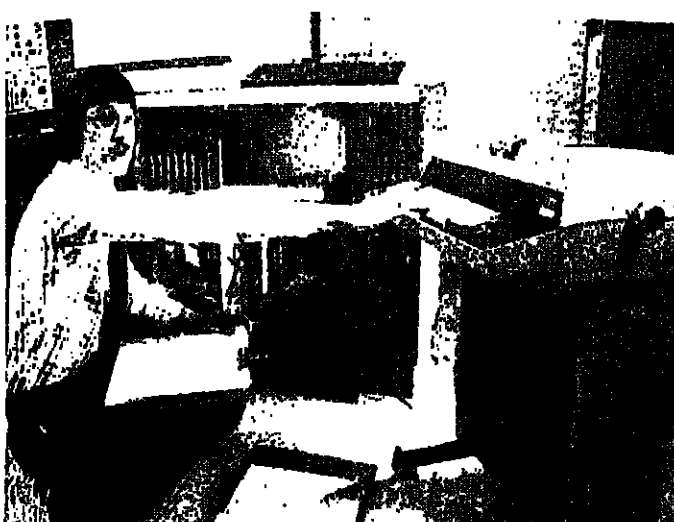
Printing this way is much faster than the current impact printers. 30 copies can be made per minute. A wide range of type faces can be held in ROM, all of which are available at the same time without any need for changing daisy wheels.

The machines can also be used as ordinary copiers, which is useful as they can get through their word processing printing very quickly and therefore should have plenty of idle time. They have a glass read station like normal copiers from which any document, containing text or graphics, can be copied.

André will say very little about the Workstation but it is understood to constitute a screen word processor with an 'intelligent copier' printer and some graphics capability. Charts and graphs can be drawn on the screen — which is larger than most WP screens now — using a joystick. The printer can then reproduce these along with any text desired, without difficulty.

The Workstation writes the information on to the drum with a laser; the Wang and Toshiba machines draw the characters on the face of a CRT, from where it is transferred to the drum by a bundle of optical fibres. The principle is the same as that used by IBM's laser printer, but the machines are much slower, and cheaper.

Another advantage of the intelligent copier is that it can be used as a type of facsimile receiver since the electrical signal can come from as far away as one likes.



Final test on first system

Final test is carried out on the first ITT 8100 ADX message switching system to leave ITT Business Systems Group's Borehamwood factory.

Costing up to £28,000 for a typical system (and less for a simpler one), the 8100 ADX is the low-cost successor to the 800 and 8400 ADXs.

Launched at Communications 78, it uses Intel 8080 microprocessors to store and forward messages between as many as 64 leased lines and 16 dialled tele-

Electronic money council set up in US

In an effort to promote public understanding of Electronic Funds Transfer, and to overcome consumer resistance, a group of US financial institutions has set up the Electronic Money Council. The council has carried out a study of consumer attitudes and is launching a publicity campaign about EFT.

The future of EFT in the US is a considerable doubt. Sales of automated cashiers and related equipment have been lower than forecast, but bankers and manufacturers seem on the whole to be optimistic, certainly more so than in the UK, where a recent report said that EFT would not come nearly as quickly as had been predicted (CW June 1).

Promoters of EFT in the US feel that consumer resistance and the scepticism of bankers are the main obstacles to growth of EFT; hence the promotion campaign. The Council's study found that fewer than half of those interviewed had ever heard of EFT, but of those familiar with it only 24 per cent were opposed.

The Electronic Money Council also wants to prevent EFT from being over-regulated by

Communication that's kind to your pocket

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'50% of revenues from software' by 1988

THE percentage of IBM's revenues deriving from software products will increase from 30 per cent to 40 per cent or even 50 per cent over the next ten years, according to one of the speakers at the forthcoming Infotech conference, computer industry investment analyst Bill Easterbrook.

In his paper on IBM and the threat from plug compatible suppliers, Easterbrook predicts that IBM will unbundle its systems software charges and also modularise its systems software to a much greater extent in order to make it harder for PCs to stay price competitive with IBM and to copy changes made by the industry leader.

Easterbrook also sees IBM modularising hardware to a much greater extent, producing individual hardware/systems software/microcode packages dedicated to functions such as language processing (like Burroughs Attached Fortran Processor),

database management and data communications, as well as central processing. One of the advantages to IBM of adopting this approach, according to Easterbrook, will be that it will make anti-trust actions taken by PCs against IBM even more complex than the cases that have already been heard.

This was underlined recently by the Memorex case, where the judge ruled in favour of IBM after the jury had failed to come to a unanimous verdict, and asserted that the case was far too complicated for a jury to understand.

Looking at one of IBM's most powerful weapons against the plug compatible CPU manufacturers, microcode, Easterbrook predicts that IBM will accelerate the rate of introduction of separately priced modules of its operating software implemented in microcode.

Easterbrook points out that it would take an independent manufacturer between six months and two years to produce a duplicate of each new IBM microcode module after its announcement by IBM. The first shipments of the product and its specification would not take place for three months to a year after its announcement and the time taken after that to copy the product would be at least three months and as much as a year.

Easterbrook concludes that IBM's policies of unbundling software and modularising hardware and software will help to maintain its profit growth and constrain PCs over the longer term. He predicts that some PCs will survive and a few may thrive, depending on their ability to become independent of IBM software and their ability in maintaining interface compatibility with IBM products.

Repeat performance of 'IBM—the next five years'

FOLLOWING the success of the conference 'IBM—the next five years' in March, the organisers, Infotech, are staging a repeat performance from September 11/13.

As March, the subject matter will cover most aspects of IBM's activities, present and future, but most of the speakers will be different and the London venue has also been changed from the Connaught Rooms to the Greenwood Theatre, SE1.

The conference opens on the morning of September 11 with a session presented by Ulric Well, who spent 16 years with IBM specialising in market evaluation and competitive systems analysis. Well is now in charge of EDP market analysis at Mor-

president of corporate marketing at Amdahl Corp, the firm that offers direct alternatives to the top and machines in the existing IBM 370 series.

Another firm that challenges IBM head on in its own marketplace, Memorex, will be represented at the conference by Dan O'Brien, marketing manager for the firm's large storage systems group. O'Brien will look at possible future peripheral systems from IBM, including new storage and I/O devices.

Another threat to IBM's huge base of mainframe computers — distributed processing — and the ways in which IBM is trying to eliminate the main rationale for it by promoting low cost satellite data communications, will be discussed in a paper on Satellite Business Systems by Howard Anderson of the Yankee Group.

The second day of the conference starts with two papers on software matters — systems software and databases — Dick Bayles of National CSS, the big US-based time-sharing bureau, will talk about the extension of IBM's software unbundling into systems software and the migration of systems functions into firmware and hardware. He will also consider the effects of these trends on future IBM architectures and on the manufacturers of IBM compatible processors.

Stephen Robinson, president of S.L. Robinson and Associates, a US firm that specialises in consultancy and educational services relating to databases, will discuss the likelihood of IBM adopting a database architecture based on the ANSI and Codasyl proposals and involving a 'back end' database machines.

Returning to the plug compatible challenge to IBM, Bill Easterbrook, of the US investment banking firm Kluder Peabody & Co, will flat the powerful battery of economic weapons that IBM can use against the PCs.

Conflicts within IBM itself, between the mainframe manufacturing Data Processing Division, regarded as the heart of IBM, and the shortly to be merged Office Products and General Systems Divisions, which are now moving into rich new markets, will be discussed by consultant Phil Dorn, in a paper on IBM's shifting revenue sources.

The third day of the conference includes sessions on

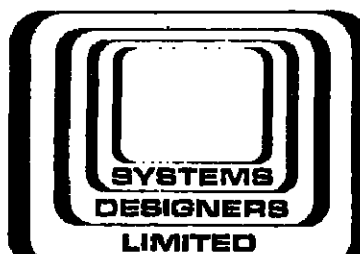
communications, IBM's position in Europe, and the user view of IBM, and rounds off with a forum in which the speakers will answer questions from the floor.

In his paper on IBM's networking and data communications plans, Howard Frank, president of the Network Analysis Corp, will consider how IBM's networking concepts, in particular Systems Network Architecture, SNA, will be extended or modified.

Possible areas of confronta-

tion between European telecommunications authorities and IBM will be one of the main topics of the paper on IBM in Europe, to be presented by David Butler, of Butler Cox and Partners.

IBM's pricing, support and maintenance policies and their effects on users will be looked at by Alan Duncan, the technical adviser to the management service division of Barclays Bank, one of the largest IBM users in Europe.



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APPOINTMENTS IN IRELAND

Eire needs to attract home its expatriates

PEOPLE are now beginning to realise the importance of the computer as an influence on their everyday lives. Earlier this year, Time magazine included a 15-page feature to explain the background of what is now the most advanced and fastest-growing industry in the world, and to indicate the impact which we can expect recent developments will have on our normal day-to-day lives. Even the pocket calculator has now been enhanced by the inclusion of microcomputers.

The key to the application of this computational power is the development of software or the programs and instructions needed to make computers intelligent. To develop software at all levels, you need skilled personnel; not just people with a strong scientific or mathematical bias, but also people with logical minds and a keen interest in problem solving.

With the continuing technological breakthroughs and developments on the "hardware" side of the industry, the most constraining factor in the use of computers is the availability of computer personnel. This was true at the beginning, nearly 20 years ago, and it is still true in 1978.

But some of the more enlightened countries have started to take significant steps to: 1. Make students both at first and second level education aware of computers and the computer industry. 2. Gear themselves at third level education to produce a substantial number of graduates in computer or related sciences, to help meet the ever-increasing demand for computer specialists generated by the continued growth in the use of computers.

To help meet the need for more skilled computer staff, of which there is an acute shortage at present, PAT RAFTER, managing director of Insight Marketing and Personnel Consultants, Dublin, gives here an overview of the computer industry in Ireland. Rafter has been in the computer business for 19 years and has covered most aspects of the industry from both sides, manufacturers as well as users. He is also a member of the Irish Computer Society.

student at first level gets virtually no exposure to computers and it is only recently that, in a limited number of schools, the second level student has had an opportunity to appreciate the computer and its potential and to realise that there is such a thing as a computer industry in Ireland. At third level, our institutes and universities do provide both diploma and degree courses, but facilities are limited and the qualified output annually from our colleges clearly falls far short of demand.

computer personnel. However, the progress of many of their development programs has been hindered by the shortage of suitable personnel.

Where there is a time constraint on an urgent project, this has led them to look for the "packaged" or "turnkey" solution. In the private or commercial sector when a decision is made to implement a project the required completion date is generally "yesterday". Here again the turnkey solution tends to be favoured, hence an increasing demand on computer manufacturers, computer consultants and software houses to provide high quality, high output computer specialists to speedily implement a wide variety of projects.

many other industries and the successful consultant needs to have an in-depth knowledge of the industry to enable him to correctly identify the client's needs, and to communicate with and accurately assess, potential candidates and their suitability for a particular job or project.



RAFTER... "In Ireland, things have moved far too slowly."

City of Waterford Vocational Education Committee WATERFORD REGIONAL TECHNICAL COLLEGE

Applications are invited from suitably qualified candidates for the following whole-time positions:

LECTURER / ASSISTANT LECTURER

with an Honours Degree or its professional equivalent plus three years' experience in:
(1) Systems Analysis / Data Processing
(2) Computer Science (microprocessors)
(3) Computer Science (general)
Salary Scales (under review) Lecturer I, £5814-£7586 (11 points scale)
A/Lecturer, £5009-£7001 (11 points scale)

Children's allowance payable where applicable.
Application forms and further details may be obtained from The Principal, Regional Technical College, Cork Road, Waterford (Tel. 061-759344).
The latest date for receipt of completed application forms is Thursday, 7th September, 1978.

K. J. LYONS,
Chief Executive Officer

Systems Analyst £4,842-£5,718

Applications are invited for the above pensionable appointment in the Police Authority for Northern Ireland. The work is concerned with assisting in the establishment and development of a computer assisted policing system. Applicants must have a minimum of five years' relevant computing experience, including a substantial period in systems design. Experience in on-line or real-time computer hardware and software would be an advantage, along with CORAL experience. Starting salary will be related to qualifications and experience. After two years' satisfactory service an allowance of £333.00 per annum is payable.

Please write or telephone for an application form quoting job reference SB 280778/CW, to the Civil Service Commission, Rosepark House, Newtownards Road, Belfast BT4 3NR (telephone Dundonald 4585 ext. 258). Completed forms must be returned to arrive not later than 7th September, 1978.

DATA PROCESSING STAFF

Waterford Co-operative Society Limited, one of Ireland's largest co-operative societies, employing 1,200 people and having a turnover of £20m is a leading processor of food and agricultural products. The Society has decided to recruit a Data Processing Manager and a Data Processing Assistant to its Head Office in Dunraven, Co. Waterford to replace an experienced data processing manager who has retired.

DATA PROCESSING MANAGER

The Data Processing Manager will be responsible for the management of the data processing department and the supervision of the data processing staff. He will be responsible for the development of data processing systems and the supervision of the data processing staff. He will be responsible for the development of data processing systems and the supervision of the data processing staff.

PROGRAMMER/ANALYST

The Programmer/Analyst will be responsible for the development of data processing systems and the supervision of the data processing staff. He will be responsible for the development of data processing systems and the supervision of the data processing staff.

Dataproducts

Dataproducts (Dublin) Limited, set up in 1965, presently employs 400 people at its Coolock facility — engaged in the design, manufacture and assembly of memory systems and line printer products for the European market. It is a wholly owned subsidiary of Dataproducts Corporation, California, U.S.A. — a leading supplier on a world-wide basis of computer peripherals.

Immediate vacancies exist for:

PROGRAMMER/ANALYST

In 1976, the Company installed a Burroughs B1717 computer and extensive applications have been developed, particularly in the manufacturing area, using on-line facilities, at present a comprehensive systems development plan is underway featuring the implementation of an on-line interactive sales order processing system. To support this plan an equipment upgrade is scheduled and an immediate vacancy exists for a Programmer/Analyst.

THE PERSON
(A) A minimum of 2 years' programming in COBOL
(B) Experience in direct-access file handling
(C) Ideally, experienced in on-line / Database applications

THE JOB
Assisting in the design / implementation of computer-based systems.

PURCHASING OFFICER

THE PERSON
Leaving Certificate with several years' experience in a major purchasing department. Anything less than 3 years' at Senior Buyer level in a Mechanical / Electro-Mechanical environment unlikely to qualify.

THE JOB
Total responsibility for the cost-effectiveness procurement world-wide for those products/commodities allocated. Reports to Purchasing Manager and deputises when necessary.

CONTRACTS ANALYST

THE PERSON
Preferably a degree in Law, Economics and / or Business Administration. First-class command of written English; to write with clarity, conciseness and maximum effectiveness. Experience in contractual / commercial/business aspects of an electronics/industrial company. A knowledge of contract law and experience in contract drafting / negotiating would be a distinct advantage.

THE JOB
Interpreting, drafting, negotiating Sales Contracts in the computer industry. Routine handling of Sales/Purchasing agreements. Production of contract status reports.

All these posts carry first-class salaries, conditions of service and fringe benefits commensurate with their responsibilities. Please write giving details of age, education, qualifications, career to date, date available, to:

The Personnel Officer
Dataproducts (Dublin) Limited
Greenacres Road, Coolock, Dublin 15
Telephone: 311626

CHRIS PRIER
Asst. Chief Executive
01-261 8028

LONDON
Edna Farrell
01-261 8019
John Farnham
01-261 8028
Francesa Gibbs
01-261 8174
John Pugh
01-261 8444

MANCHESTER/GLASGOW
061-827 4211
BIRMINGHAM/BRISTOL
021-359 4932

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

SYSTEMS ANALYSTS

ON-LINE REAL-TIME DEVELOPMENT

MIDDLESEX

c £7000 + Car

We are seeking experienced Analysts or Analyst/Programmers keen to enhance their career by developing several advanced on-line and real-time applications using the latest DEC and IBM hardware.

Applicants should have a minimum of three years' commercial systems experience, gained in an installation with high standards of analysis, design and documentation. Technical training in the systems software to be used will be given to successful applicants.

The company offer a salary package c £7,000 with good conditions of employment including subsidised canteen, pension scheme, company car and excellent career potential.

Ref. W1/2408

24-hour answering service

Please telephone for a confidential discussion or write to:
30 Fleet Street, London EC4Y 1AA
01-353 0981

DERBYSHIRE CONSTABULARY

Applications are invited for the following post at Force Headquarters, Ripley, Derbyshire. A job description is available.

SYSTEMS ANALYSTS

The salary will be in accordance with the N.J.C. Scale SO.1/2 £4,920-£5,748 per annum, plus £312 per annum 1978 supplement. The successful candidate will be required to form part of a newly created computer project team. He/she should have a programming background, preferably in real-time systems, with a working knowledge of a low level language. He/she will be required to assist in the evaluation, design and implementation of major systems under the direction of the Project Manager. The work will involve the design and development of dedicated on-line computer systems for the Derbyshire Constabulary, which will include Police Command and Control and information systems, from feasibility to implementation, and thereafter continuing systems development and maintenance; also liaison with the Local Authority in connection with the design and development of applications on their mainframe IBM 370/145 computer. A Degree or appropriate professional qualification is desirable. Suitably qualified disabled persons will be considered. Application forms from the Chief Constable, Force Headquarters, Ripley, Derbyshire, to be returned by 8th September, 1978.

UNIVERSITY OF YORK

COMPUTER HARDWARE TECHNICIAN

Applications are invited for the above post to assist staff and students in their teaching and research activities. The post principally involves designing, constructing, testing and maintaining electronic equipment in the digital systems laboratory. Applicants should have some experience of digital electronics and an appropriate qualification. No knowledge of specific computer circuitry is required as training will be given. Salary on Grade 3, £2,885-£3,080 per annum. Applications in writing giving names and addresses of two referees and specifying the post to which application refers, should reach the Deputy Bursar, University of York, Heslington, York YO1 5DD, by Monday, 4th September, 1978.

THE UNIVERSITY OF SHEFFIELD

DEPARTMENT OF ARCHITECTURE

COMPUTER PROGRAMMER

Applications are invited from men and women for a post of Computer Programmer to work on the development of interactive programs for a project which is evaluating the use of computer aided design in architectural practice supported by the S.N.C. Scheme 3 system from 1 October 1978. Starting salary £2160 a year. Further details from and applications to Dr P. R. Lupton, Department of Architecture, The University, Sheffield S10 2TN by 1 September, 1978, quoting ref. 1103/88.

Contracts EXPERIENCED FREELANCERS AND NEWCOMERS

If you have the following:

DIS/VS PL1
PDP/11 MUMPS
CORAL 66
IBM IMS

Telephone: MANHATTAN
on (01) 531 9131

We also have a limited number of vacancies for graduates with 6-18 months experience.

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All Grades
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Perhaps you have some of the traditional misconceptions about contract people. So let us put you firmly in the picture. Contract staff placed by us are warmly welcomed by a long list of clients who know what they're talking about — and by their own DP people. They tell us our people play a vital role in achieving objectives which would otherwise be big problems. We get nothing but praise for the way we match individuals to user installations. We know that contract work can give you high earnings, invaluable experience and new directions. Why don't you ask us to prove it?



These are some of our current requirements Operators

European languages a distinct advantage

IBM 370/168/158 OS VS/1/2 ICL 2960/70, 80 VMEB/K DME ICL System 470/2 & 50 J & MULTI System HONEYWELL 66/60 GCOS	IBM IBM Data 100 IBM System 3 & 32 Ops. IBM 370/DOS VS (POWER GRASP & CICS) JCL Writers OS & DOS ICL ICL 2903/4 Ops.	ICL 1900 G111 Ops. & Data Controllers ICL 1900 G1 & G11+Ops. OTHERS Burroughs Small & Medium Systems Honeywell Level 60 Terminal & Small Systems Various Contracts.
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For further details or advice on these or other U.K. and European Contracts, call Sue Smyth, June Mogg or Jane Asbury, NOW! on 01-491 4706 or 01-439 3411.

Programmers/Analysts

Immediate/Forthcoming Assignments

IBM ASSEMBLER + CICS - London PL/1 + OS - S. Coast BASIC + TSO - Beds COBOL + DOS - Surrey BAL + OS - City SYS 3 RPG II - Berks	ICL 2900 COBOL - Belgium 2903 COBOL - London MINI/MICROS FORTRAN + RSX II - London FORTRAN + RSX II - Berks CORAL 66 REALTIME - Dorset DEC PDP ENGINEER - Hong Kong	MACRO 10 + TOPS 10 - Holland PDP BASIC + - Bucks FORTRAN - London PDP MUMPS - Holland HONEYWELL LEVEL 66 COBOL - Holland LEVEL 66 COBOL - Belgium
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Please contact Richard Kaluzynski or Sue Gillam, 01-491 4706 or 01-439 3411.

All vacancies are open to both male and female applicants.



Knight Computer Services Limited,
14 Old Park Lane, London W1Y 4NL
Staff Services Division of BOC Datasolve Group and
a member of Computing Services Association.

01-491 4706

01-491 4706

Our Clients are an exciting U.S. and internationally based mini computer manufacturer whose technological innovation has taken them into the top 5 in the mini computer field. Backed by the security and research of a multi-million dollar corporation, their products are taking the traditional and distributed processing markets by storm. This is creating a challenging and dynamic working environment offering excellent prospects for the future both in this Country and overseas.

The successful candidate will take responsibility for a sophisticated range of distributed processing systems currently enjoying a rapidly expanding market. The successful candidate will work in a true product marketing role and responsibilities will be extensive, challenging and range from market research and product definition through to the formation of product strategies and merchandising programs. The determination of pricing policy and control of line profitability will also be key aspects of this position. The successful candidate should ideally have:

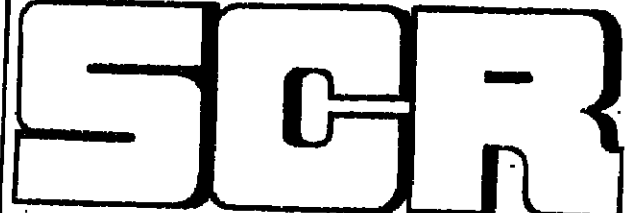
- * qualification to Degree standard in a related subject
- * a good technical understanding of mini computer software/hardware
- * an empathy with sales (ideally gained in a direct sales role)
- * 1-2 years' experience
- * aged between 25 and 35

This position will be based in the Northern Home Counties, relocation expenses will be paid to the successful candidate. Other benefits include profit sharing, pension and private patients scheme.

For further details: Ref. CW/8/2.

CONTACT: David G. Wade on 061-833 0427 or 0785 56013 after office hours.

SPECIALIST COMPUTER RECRUITMENT LIMITED



BIRMINGHAM 021-236 3781
Freeport, Equity and Law House,
35-37 Great Charles Street, Birmingham B3 2BR
MANCHESTER 061-833 0427
Freeport, Blackfriars House, The Paragon, Manchester M3 8BB
LONDON 01-935 0671
Freeport 6, 102, Blandford Street,
London W1E 1JZ



Analyst/Programmer & Programmers

Additional staff are required to assist in the replacement of the Society's twin NCR Century installation by a 192K Criterion with discs/tapes and on-line terminals.

Applicants should have at least 1 year's Cobol experience and knowledge of NEAT 3 would be an advantage.

The successful applicants will be involved in a variety of projects, including the implementation of an on-line warehouse stock control system, processing of data captured from on and off line P.O.s, terminals and various new accounting systems.

The Society offers competitive salaries, subsidised canteen and normal fringe benefits.

Write or phone for application forms to the Personnel Officer,
Cambridge & District
Co-operative Society Limited,
73 Burleigh Street, Cambridge
CB1 1DW. Telephone
Cambridge 68844 ext. 226.



HEALTH SERVICE COMPUTING

Career openings have arisen at our Computer Centre based at New Southgate, London N11.

Ref. No. 3381

SENIOR SYSTEMS DESIGNER

Salary Scale £5,313-£8,379

SYSTEMS DESIGNER/PROGRAMMER

Salary Scale £4,775-£5,680

PROGRAMMER

Salary Scale £3,806-£4,778

Salaries inclusive of £354 London Weighting.

New entrants enter at the minimum of the scale. Equipment consists of an ICL 1904S, with 10 EDS 80s running under the George 3 operating system with communications facilities, an NCR microfiche processor and Redifon key-to-disc system.

As well as the Payroll, Accounting, Medical and Scientific applications, staff are required to support a variety of mini computer installed in hospitals and laboratories around the Region.

The main programming languages are COBOL, FORTRAN and PLAN. Appropriate training will be given as required. Flexitime system around a 36-hour week.

Application forms and further particulars from the Regional Personnel Officer, North West Thames Regional Health Authority, 46 Eastbourne Terrace, London W2 3QN (Telephone 01-262 8011, Ext. 261) quoting the appropriate reference number. Closing date 8 September, 1978.

Systems Designers

Saudi Arabia £8,000-£10,000 after tax

Do you have at least 2 years' experience using mark IV on a 370 operating under OS/VS? Have you at least 1 year's experience of COBOL, PL/I, and time sharing option?

Have you worked on major materials/inventory control applications?

If you have, and you also hold a full U.K. driving licence, we would like to hear from you as soon as possible on behalf of the Arabian American Oil Company (ARAMCO).

Appointments are single-status based on 12 month renewable contracts. Bachelors have 30 days paid U.K. leave between contracts, married men on single-status have 2 weeks' paid U.K. leave every 4 months with 25 days between contracts. Excellent medical care is free, housing is air-conditioned and recreational facilities are first class.

For further details, please write or, better still, telephone, quoting reference R 362, to Richard Darvell at Astral Recruitment Associates, Astral House, 17-19 Maddox Street, London W1R 0EY. Telephone 01-629 2354 (ask for Mr. Darvell).

Astral Recruitment Associates

Systems Analyst

Bahrain c £11,200 p.a. tax free

Systems Analyst/Programmer

Bahrain c £9,800 p.a. tax free

- * End of Contract/End of Service Benefit also tax free
- * Free furnished accommodation and utilities
- * Paid home leave on completion of contract
- * Free Company primary schooling with generous education assistance for secondary education for eligible children

The Bahrain Petroleum Company Limited, a large company in the oil industry, offers challenging opportunities in its rapidly developing Computer Services Department based at Awali, the Company township in Bahrain. The town, covers an area of nearly a square mile and provides homes, community services and recreational facilities for employees and their families.

The Computer System comprises a System 370/135 with 512K, operating under OS/VS1 and a System 3712, both with batch and online processing. The data base is TOTAL with ENVIRON for its teleprocessing support.

A wide variety of technical and commercial applications are already in use. Additionally, major areas of development are proceeding making use of real time, remote communication, and data base management techniques.

Systems Analyst

Candidates will be required to carry out feasibility studies, analysis and design systems, prepare system specifications, programming specifications, and user manuals. Candidates must have ability to communicate effectively with various levels of management.

Candidates should have at least 3 years experience in systems analysis and design and must have taken at least one major system from feasibility to implementation.

Practical programming knowledge particularly IBM Cobol is necessary. A knowledge of data base and teleprocessing techniques will be an advantage. Candidates should have a degree, HND or equivalent.

Systems Analyst/Programmer

Candidates must be able to take outline specifications prepared by a Systems Analyst and carry out detailed design, coding, and testing of programmes.

A minimum of 4 years Cobol experience and at least one year's analysis in a 370 environment is essential. A knowledge of TOTAL and ENVIRON is desirable. It is essential that candidates are self motivated and prepared to work occasionally abnormal hours.

Both the above vacancies will be on the basis of a one year contract renewable by mutual agreement. Free medical attention for employees and married or bachelor furnished accommodation provided. Please write with full personal details, requesting an application form, to:-

Personnel Relations Department, Caltex (U.K.) Limited,
30 Old Burlington Street, London W1X 2AR.
Quoting reference SA/CW



URGENTLY REQUIRED

Electronics Design Engineers

System and Test Engineers

Programmers and Analysts

for perm. and contract in London, U.K. Overseas.

Telephone: 01-629 7581

City Centre Technical

299 Oxford Street

LONDON W1

CONTRACT PROGRAMMERS REQUIRED

ICL 2904 On-line System
COBOL CORTEX and IDMS

Experienced ICL COBOL programmers required for a six-month contract. Good rates.

Ring D. Morfett 01-953 0091 for details

F. W. O. BAUCH LIMITED
49 Theobald Street
Borehamwood, Herts

SYSTEMS ANALYST

new position DERBY AREA

to £5,400 p.a.

Our client is a leading engineering concern who are developing Production/Contract Costing/Financial Modelling systems using on-line (real-time) techniques as appropriate.

An additional person, preferably with experience in designing on-line systems, is required to lead or join a project team consisting of user and DP personnel. The company are in a continuing state of expansion and prospects for advancement are excellent.

Good salary together with relocation package plus discount allowance will be offered to the successful applicant. Interviews available locally evenings or weekends.

To register for this position, and to obtain further information, please contact LEE NICHFIELD LIMITED (Computer Recruitment Consultants), Bridge Buildings, Leighton Road, Chesham, Bucks, HP8 4NR. Tel: 0494 6851. Day: 0494 6852. Evening: 0494 6853.

JBA

Senior Systems Programmers

London based £8,000 + bonus/profits
A recently established software house is keen to recruit several highly skilled and professional IBM Systems programmers, in order to build a team capable of innovative development work.
From the outset, you will be responsible for seeing that a reputation for quality is established in the market place and for helping to ensure the success of the business, both by your professional approach to the job and by your commitment to the company.
A real opportunity for ambitious self-starters seeking to contribute significantly to success and be well rewarded for results. Gross earnings are unlikely to be less than £9,000 in the first year.
Contact: Andy Wright

Technical Authors (Software)

Nr. Uxbridge c.£8,500	Holland c.£11,500+package
Herts. c.£5,000-£6,000	Central London c.£7,000
Berkshire c.£6,000-£7,000+	Switzerland c.£15,000+package
Surrey c.£6,500-£7,000	

The above locations indicate a selection of our clients with current vacancies for either potential or experienced writers; the salaries stated are definitely on offer for candidates who meet the requirement. In some cases the client concerned is in the process of setting up a technical publications team. In most cases either complete or very generous relocation expenses can be negotiated.

We welcome calls from anyone now engaged in documentation or interested in making a career change into this creative, interesting and financially rewarding work. We have many other clients in other UK locations and overseas.
Contact: Mike Creamer

Analyst/Programmers

Coventry c.£5,500
A well known industrial organisation is looking for several Analyst/Programmers to join their expanding systems development teams. Several years as a COBOL programmer is essential together with some experience in the design of at least one commercial application.
Above average salaries and opportunities. Generous benefits including relocation assistance.
Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

Computer Services Manager

Home Counties up to £12,000 + bonus and car
Our client, one of the largest software houses in Europe, is continuing to expand its services and now requires a senior manager to set up and run a new group offering facilities management and operations support.
Applicants must have an established management record with drive and ambition. A broad based background in the computer industry, some of which should have been within a software house, is essential coupled with an entrepreneurial flair.
This is a senior appointment carrying an appropriate salary and excellent benefits.
Contact: Jim Baker

Engineer Programmers

North Surrey £1,500 £8,000
This company, a subsidiary of an extremely large engineering consultancy group, specialises in producing individually tailored industrial systems usually based in either PDP 11 minis or INTEL minis. All successful candidates can have a career leading to Chief Engineer and above - your capabilities and drive will be well rewarded.
Applicants should have at least 1 years mini or micro systems experience with a good knowledge of a low level language. If you also have an Engineering or Electronic design and/or experience of hardware design, this could prove extremely useful.
A career with this company will ensure total involvement in the latest techniques and applications of this type of processing. Contact: Andy Wright

Programmers

London £5,500
A large commercial organisation has opportunities for programmers to join a well established data processing department to work on the development of new systems.
Candidates should have at least eighteen months experience of COBOL, PL/I or Assembler on an IBM or ICL mainframe. A commercial background with database or real-time application would be an advantage.
Excellent salaries and an opportunity to work in a professional environment.
Contact: Jim Baker

Senior Computer Operator

Software evaluation involvement

Old Windsor

up to £4000

1977 turnover was up 45% to nearly £420m, and this sales success is matched by expansion in our Training Division here at Old Windsor alongside the Thames.

You will join our Computer Services Department, working on an ICL 2904 operating a two shift system (08.30-00.30) 5 days a week. The job offers valuable experience since software evaluation is conducted here.

We are looking for an experienced Operator who has worked on 2903 or 1900 computers.

You will find the working environment excellent and there are good opportunities to progress. Recreation facilities include an indoor swimming pool, bar, squash and tennis courts.

International Computers

think computers - think ICL



ROYAL PACKAGING INDUSTRIES VAN LEER BV HOLLAND

Cobol Programmers up to £10,000
Analyst/Programmers up to £15,000

The Head Office of this world-wide group of manufacturing companies wishes to recruit personnel for the Group Computer Centre in Amsterdam.

We have an IBM 370/125 operating under DOS/VS and are looking for proven experience in Online Systems (using CICS), Financial Administration and Stock Control experience would be advantageous.

We can offer the successful applicant Personal development in a challenging environment, international experience with secure employment, Significant benefits package, British Management, English speaking environment.

Please phone or write to Brian Blackwell, Van Leer (UK) Ltd., Van Leer House, Beaumont Avenue, West Byfleet, Weybridge, Surrey. Tel: Byfleet 41161.

Employment opportunities for programmers and analysts in the

U.S.A.

*COBOL, PL/1, Assembler

*IMS - DL/1

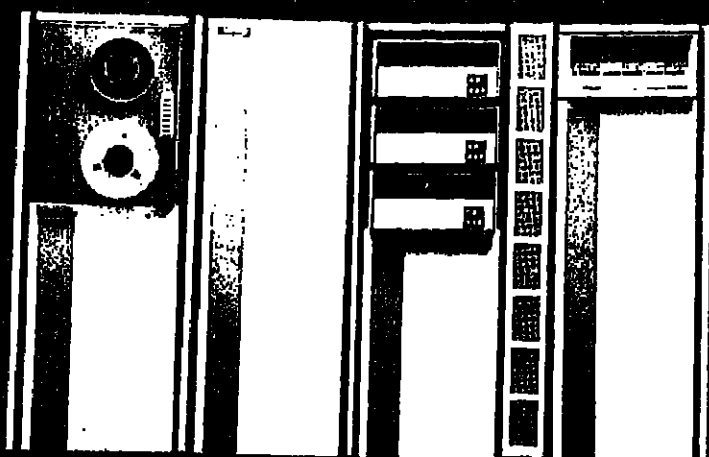
*CICS

*Mini and Micro Computers

Salaries from £7k to £13k depending upon level of experience plus relocation reimbursement possibilities.

Informal interviews will be conducted in London, August 28th-31st. Appointments may be made by telephoning Ralph Payne at 01-283 4363 on August 28th/29th by writing with career details to Ralph Payne, Great Eastern Hotel, Liverpool St., London E.C.2.

U.S.A. is life



MOVE INTO 'CLASSIC' CIRCLES - NOW

Modular Computer Services MODCOMP to the people in the know recently introduced an important new member to its established series of mini computers. The launch of 'Classic' will not only consolidate the company's position with existing industrial, data communication, scientific and engineering applications, it will also open up new markets for the wide range of MODCOMP mini computer products. This major product launch will obviously expand the company's operations throughout the UK and Continental Europe and the personnel we are now looking for, listed below, represent the beginning of a major recruitment campaign.

COVENTRY SALES ENGINEER: to £8,000 basic p.a. + commission

Dynamically engaged and needed to work from our Coventry office and cover a wide area in the UK. Essentially the person will already have a proven background of successful selling within a mini computer environment. Should preferably have a knowledge of process control, scientific and engineering markets and be capable of the kind of drive and determination that will earn you £5-£6k commission above targets met.

COVENTRY SYSTEMS SOFTWARE SUPPORT UK: to £6,500 p.a. plus car

A rewarding job for someone who enjoys getting to grips with complex software problems and who can discuss them with users and engineers. Must have a background of assembler working on operating systems and systems software, preferably in real-time communications, mainframe or mini. Travel within the UK is obviously involved.

MODCOMP
Computer Classics

WOKINGHAM SYSTEMS SOFTWARE SUPPORT EUROPE: to £9,000 p.a.

A similar position to that in Coventry but also offering the opportunity to travel throughout Europe providing technical software support to a wide range of MODCOMP users. It additionally demands co-ordination of information between the various regions and the development group in the United States.

WOKINGHAM SENIOR ANALYST PROGRAMMER: to £6,500 p.a.

MODCOMP'S "in-house" functions will include accounting, order processing, production control, etc. This will need a first class COBOL programmer who enjoys being involved from design through to implementation. The person will probably work well alone and a background of commercial programming on minis is preferable, though not essential. An understanding of financial applications is also important, as is an ability to take on the responsibility for implementation.

MODCOMP offers excellent company benefits and good salaries. Benefits include free BUPA coverage and non-contributory pension, excellent working conditions and the opportunity for personal success as MODCOMP grows. Relocation expenses will be considered.

For full details on any of the appointments, contact Anne Campbell on Wokingham (0734) 781179 - or send Anne a resume to:

Modular Computer Services Inc.,
The Elms,
26 Broad Street,
Wokingham,
Berk.

Operational Systems Development Supervisor

Our client is part of a major British engineering company with manufacturing units throughout the UK. Due to recent expansion and modernisation programmes a number of vacancies have arisen and currently they are seeking an Operational Systems Development Supervisor to be located in the London area.

The ideal candidate, educated to degree level, will have a minimum of three years experience in systems development with one year at supervisory level, and a working knowledge of NCR hardware. Programme languages should include NEAT and a knowledge of COBOL will be an advantage.

On appointment the responsibilities will include personal involvement in analysis and programming, the supervision of analyst programmers and the maintenance and development of existing systems. In addition the Supervisor will be responsible for the implementation of new systems which have been developed at a central site and relate to IBM main frame and mini-computers.

You will be working within a challenging manufacturing environment which will demand initiative and enthusiasm.

Conditions of employment are excellent and include a competitive salary, contributory pension scheme and participation in the company car lease scheme. Relocation assistance will also be available where applicable.

Male or female candidates should write giving full but concise details of age, qualifications, career history and salary progression to date. State the name of any organisation to whom your letter may not be sent and address your application to: Mr. H. D. Taylor, Regional Manager.

Whites

Whites Recruitment Limited,
Phoenix House, 45 Cross Street, Manchester, M2 4JF
Offices: Bristol, Glasgow, Leeds, London and Wolverhampton

SYSTEMS ANALYST-PROGRAMMER

required to form part of the small highly specialised computer team at Strathclyde Police Force Control Centre 173 Pitt Street Glasgow

Salary
£4000 - £4500
inclusive of
supplement.
Grade AP1/IV

Qualifications
Degree or equivalent
Experience in one of the following areas:
- Microcomputers and distributed processing
- Communications software
- On line programs techniques

Duties
The successful candidate
will be responsible to the
Installation Manager for
all programming projects
under his/her control

Application forms may be obtained from the Assistant Director of Manpower Services, 21 Gordon Street, Glasgow, G1 3PS, (Tel: 041-221 4278) to whom completed forms should be returned within 14 days of this advertisement appearing in the press. (Ref. G114).

STRATHCLYDE POLICE
WORLD LEADERS IN COMMUNICATIONS

BELGIUM £20,000-£24,000 P.A.

PACKET SWITCHING SYSTEM DESIGNERS

—Required initially for the system design phase of advanced packet switching networks utilising newly developed telecommunications hardware. The successful candidates for these positions will probably be in their early 30s, educated to degree standard and will have a career background which includes substantial mini computer experience, Assembler and high level language programming, systems analysis and design of mini computer equipment in a real time telecommunication environment.

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REF: DCO/010877

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Tel: 01-938 4066

Management Information Centre
Waltham Forest Precinct

Management Systems Project Leader P01/2

The Job
We need to fill this key post with an energetic analyst able to demonstrate considerable personal initiative and managerial ability in a creative environment. A relevant degree or equivalent qualification together with experience of developing further development of the data management system. The Project Leader will work with a small team of programmers involved in developing future needs for information systems with a wide range of senior managers in the Polytechnic.

The Person
We need to fill this key post with an energetic analyst able to demonstrate considerable personal initiative and managerial ability in a creative environment. A relevant degree or equivalent qualification together with experience of developing further development of the data management system. The Project Leader will work with a small team of programmers involved in developing future needs for information systems with a wide range of senior managers in the Polytechnic.

Further details and application forms are available from the Personnel Office, North East London Polytechnic, 189 The Grove, Stratford, E12. Telephone: 888 0811 ext. 32, quoting reference no. A648/78. Closing date September 7th, 1978.

NELP North East London Polytechnic

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The person appointed will become responsible for twelve operating and control staff and should therefore have sound technical experience, coupled with proven supervisory ability.

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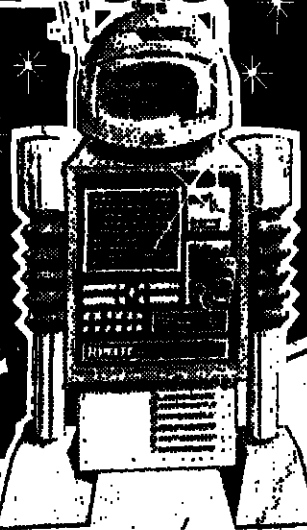
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So, if you're looking for the opportunity to join a company during an exciting stage of its development, please write with full details to: Stuart Drayton, Chief Engineer, Cray Research Inc. James Glaisher House, Grenville Place, Bracknell, Berkshire, or phone him on: Bracknell 21515. Interviews will be held early in September.

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BASIC PROGRAMMER

£4421 - £5326 p.a.

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We have positions immediately available for experienced Computer Programmers who should have at least two years service. The salary scale ranges from £4421 - £5326 per annum.

The successful candidate will be required to work 37 hours within 5 days per week.

National Health Service Conditions of Service apply and a contributory superannuation scheme is in operation.

For an application form and further details write or telephone:

The Personnel Division
Welsh Health Technical Services Organisation
Heron House, 35/43, Newport Road,
Cardiff, CF1 1SB. Tel. Cardiff 499921 Ext. 126.

Closing Date: 11 September 1978

COMPUTER CENTRE
Welsh Health Technical Services Organisation
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CW 24/8/78

Polaroid, internationally famous for 'instant picture' cameras, film and photographic equipment are seeking the

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Systems Designer £6,000

The successful applicant will have full project management responsibility for new applications and will work closely with user management. He/She will be involved in joint development projects with U.S. and European Polaroid locations and some degree of travel can be expected. Recent developments include online IMS database systems in Materials Management and Personnel, with others planned for

a variety of areas including Finance, Purchasing and Production Control. Candidates should have 3 years systems analysis experience preferably in a manufacturing environment. Financial systems experience would be an advantage. IMS experience is not essential. Training will be given.

Data Administrator £6,000

As part of our continuing expansion into online database systems we require a Data Administrator to be responsible for data definitions and descriptions within our systems. It is planned to extend the concept of data management to both manual and computer systems. This is a major undertaking for the successful candidate in a relatively new field of data

processing. He/She should have several years experience within a manufacturing environment. A data processing background which includes Cobol, IMS OS and the Datamanager Dictionary system is desirable. Training will of course be available where required.

Our modern plant is situated close to Loch Lomond and the Trossachs. The district has the widest possible range of leisure facilities and reasonably priced housing is available.

As a sophisticated international company Polaroid offer a highly competitive salary and excellent conditions of employment. A generous relocation package is available if appropriate.

Telephone: Alexandria 34141 for an application form or write to Personnel Department, Polaroid (U.K.) Limited, Vale of Leven Industrial Estate, Dumbarton.

POLAROID



MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

ANALYST PROGS.

Northern England

c £7k

We are recruiting on behalf of a large commercial manufacturing concern who require a number of experienced analyst programmers, preferably with Cobol in their background, to join a new team enhancing their current PDP11 network.

The positions will be based in Leeds, however, travel within the U.K. will be necessary on occasion.

Applicants should have at least 2-3 years' experience in data processing gained in a commercial environment.

A number of people with lesser qualifications and experience are required by our client to participate in their excellent in-house training scheme.

The fringe benefits and career prospects within this company are excellent as is the working environment.

For further details and a confidential discussion, please contact Tony McGrath.

PROJECT LEADERS

London

c £9k

GET ON LINE with one of the most progressive installations in the country.

The true data processing professional will realise that 'batch' is out and distributed processing is in. Realising this you will have probably been searching for this opportunity for some time. The company for whom we are recruiting already have a sophisticated network and are now looking to enhance this further throughout the U.K. and Europe.

Applicants for these positions will be expected to have a thorough grounding in systems analysis, preferably with a programming background, which you will have gained in a commercial environment. Whilst previous experience of project leadership would be an advantage, applicants with potential will be given every consideration.

For a full and confidential discussion, please contact Tony McGrath.

SOFTWARE PEOPLE

London & H. Counties £4-10k

Our client is currently seeking programmers and analysts with solid experience on any major international mini or micro such as DG Nova, PDP11, GEC 4000 and Intel 8080 series.

Professionals with practical experience of systems software work in the areas of I/O handling, disc monitors, assemblers, or high level compilers will be especially interesting, as would people with industrial systems experience on minis or micros.

A programmer with specific experience of MACRO II under RSX11M, and I/O driver writing would be of particular interest, especially if coupled with message switching and terminal control.

No matter how little or how much assembler and software experience, why not discuss your situation with me.

Contact Derek Pearson.

CUSTOMER ENGINEERS

Sheffield

c £6k + Car

Experienced minicomputer engineers are needed by our client to maintain the sites they have in the above area.

Working on powerful modern computer systems manufactured by the company, there is considerable scope for personal development in both technical and management areas.

Being the representative of the company, it is essential that the new members be independent and conscientious, with experience of customer liaison. Technical competence is also important, but the company will be providing a thorough training on all the equipment they will be maintaining.

A company car will be provided, and there are numerous other valuable benefits. Relocation allowances may also be available for the right person, but this is negotiable.

For a positive career with a respected company, contact Peter Gorton.

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KNIGHTS KNOW HOW

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Support Analyst

W. LONDON

One of the fastest growing subsidiaries of an international mini computer manufacturer is moving shortly to brand new offices located W. London, adjacent to tube route. They are seeking an analyst to maintain a high level of back-up technical support within their group applicants should be familiar with small/medium mini computers, with additional knowledge of IBM VS or system 3 useful but knowledge of COBOL essential

- * Company expect to expand by 50% in the coming year.
- * Excellent training in BASIC and all hardware/ software in their product ranges.
- * RELOCATION expenses.
- * Salary: to £6,500 + COMPANY CAR.

Ref. 1709

Analyst Programmer

CITY

Old established Merchant Bank has opportunity for person with COBOL and PL/I experience to work primarily as a programmer but also be involved with analysis — would ideally suit ambitious programmer with desire to do more than just coding. This position is in the "investment" area but company will consider any good commercial background, DL/I Database is currently being developed, for which FULL TRAINING will be given.

- * Large budget allocated for training purposes.
- * Variety of new development including DL/I DATABASE.
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- * CHEAP MORTGAGE and insurance, low interest loans, season ticket scheme and excellent Sports/Social club.
- * Salary: £6,000.

Ref. 1711

Snr. Programmer

LONDON

Our client, an international company centrally located seeks a good programmer with sound COBOL experience. Working in a team which is principally engaged in the development of systems used to support the company's telecommunication activities throughout the world. Their equipment is ICL 1900 series but will consider other machine experience.

- * Continued development with a well planned schedule.
- * Good promotional prospects.
- * Progressive organisation.
- * Opportunity to learn new languages and get on to MINIS.
- * Salary to £6,300.

Ref. 1700

Programmers

ESSEX

Management services division of major British group with annual turnover of almost £100m seeks COBOL programmer with minimum 2 years' IBM or ICL COBOL within a project team. Programmers will become involved in program design, coding, testing and documentation as well as assistance in systems implementation. Company offers:

- * Comprehensive range of applications.
- * Opportunity to move to more advanced technical projects and variety of languages and machines.
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- * RELOCATION expenses.
- * Salary to £5,500.

Ref. 1624

Systems Analyst

LONDON

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- * Excellent working environment.
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- * Full banking benefits including subsidised mortgage and personal loans.
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Ref. 1594

Programmers

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MID-GLAMORGAN COUNTY COUNCIL

County Treasurer's Department

SYSTEMS ANALYST

(Commercial Project Team)

SYSTEMS ANALYST

(Borough Council Project Team)

Salaries £4245-£5658 inclusive of nationally negotiated supplement.

Commencing salaries will depend on qualifications and experience. The authority currently operates an ICL 1904S computer and is now actively planning for the introduction of an ICL 2932 computer next year.

Applications are invited for these vacancies which exist within project teams concerned with the development of commercial systems and programs.

A minimum of one year's systems experience is desirable and applicants must hold a relevant qualification.

Flexible working hours scheme is currently operating. Salary allowances and terminal expenses will apply.

Application forms to be returned by 8.9.78 are obtainable from the County Treasurer, Mid-Glamorgan County Council, County Hall, Cardiff.

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RPG 2 PROGRAMMER

Programmer willing to learn RPG 2

New computer department based in BIRMINGHAM has two System 3 Model 15 CPUs with a TP network serving nine locations in the UK

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UNIVERSITY OF MANCHESTER

2 Project Leaders

Administrative Data Processing

£6,317-£7,754 (£8,250 with effect from 1.10.1979)

The Administrative Computer Unit provides a computing service to administrative departments in the University of Manchester on a 120K ICL 1902T. In addition to a wide variety of batch systems, several interactive on-line systems have been developed under T.P.S. An ambitious programme of development for the next five years and beyond has been started, and to help with this the Unit now needs two additional Project Leaders.

1. PROJECT LEADER — Systems Programming

Applicants, preferably with a degree or equivalent qualification in Computer Science, should be capable of maintaining and developing existing systems software and providing technical advice to the Unit on the purchase of further software packages. Some years' experience of 1900 hardware and software, probably in a commercial environment, are necessary and a knowledge of T.P.S. would be advantageous. An ability to communicate effectively with staff at all levels is important.

2. PROJECT LEADER — Data Processing

Applicants, who should have several years' experience of COBOL programming and systems analysis in a commercial environment, must be able and willing to accept total responsibility for a system from specification to implementation. A personality which will permit an easy working relationship with users is essential. A knowledge of I.C.L. 1900 equipment and software would be advantageous, especially if this includes on-line experience.

Both posts will be in Administration Grade II, and benefits include a good contributory pension scheme, 30 days' annual leave plus public holidays, and good meal and recreational facilities.

The University is situated near the centre of the city with a wide variety of housing and amenities within easy reach.

If you would like further details or would like to discuss these appointments with the Executive Director of Data Processing Manager, please ring 061-273 3333, extn. 3788 or 3789 (8.15 a.m. to 5.30 p.m.) or 061-432 1638 after 7 p.m. Written applications giving full curriculum vitae should be addressed to the Registrar, University of Manchester, Oxford Road, Manchester M13 9PL, to arrive not later than August 31, 1978. Quote ref. 207/78/CW.

City Office requires an experienced (minimum 12 months) ICL 2904 COBOL PROGRAMMER to join a small team engaged in computerising commodities. Real time programming is essential and experience in scientific development.

Salary is £3,000-£3,500 p.a. plus benefits. Salary according to experience.

Please apply to The Data Processing Manager, C. Carmichael Limited, 28 Mark Lane, London, EC3, (01) 480 8877 Extn. 250.

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C. London

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UNIVERSITY OF GLASGOW

DEPARTMENT OF NATURAL PHILOSOPHY

SYSTEMS ENGINEER

The Kelvin Laboratory, which is a research unit of the University engaging in Nuclear Structure Physics, has a vacancy for a Systems Engineer. The control computer in the laboratory is a DEC System-10 multi-access, time sharing system. This is linked to several mini-computers the chief function of which is data acquisition for the two electron linear accelerators. The post of Systems Engineer involves hardware and software development in support of all the above equipment, and the provision of laboratory services to the research staff. A major expansion of the facility to include links to B.R.C. computer networks is scheduled for September, 1978, and a variety of new laboratory equipment will subsequently be installed.

The salary will be in the range £3384 to £5120 plus superannuation scheme benefits. Applications should be sent to the Registrar, University of Glasgow G12 8QQ.

For further information or an application form please contact Carolyn Bennett.

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My present salary is in the range of ☐ £3500/£4500 ☐ £4500/£5500 ☐ £5500 plus

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ROMFORD, ESSEX RM1 3PJ**

TEL: ROMFORD 0708-44181/2

Top contract fees

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IBM 360/50 programmer for South West London, three years plus experience, DOS, OS Conversion and maintenance of mail order package - some travel to France necessary. O level French an advantage. Salary to be negotiated.

Apply to

Personnel Manager, 18 St. Ann's Crescent, London, SW18.

CRC INFORMATION SYSTEMS

at SLOUGH

Requires an

ELECTRONICS ENGINEER

Location: Slough to assist the Communications Manager in the design and maintenance of electronic equipment associated with data communications. A familiarity with mini/micro computers and/or data communications equipment is desirable but not essential. Salary £16,000 p.a.

Apply in confidence to
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Communications Manager
CRC Information Systems Ltd.
FBO Deal Way
SLOUGH SL1 4PH**

occ computer personnel limited

SYSTEM TEN (London)

Consultants

A major UK Software House is expanding its successful ICL System Ten Operations in the London area. Excellent career prospects are offered to the following staff.

Programming Consultants

to £6,800

We are looking for fluent ASSEMBLER programmers interested in a new involvement with Systems Ten Software. A background in Analysis/Design or System Ten experience would be ideal. Opportunities will exist to take on project responsibilities. Minimum experience in DP: 5 years. Ref. 529/CW/RN

Senior Consultants Project Leaders

to £8,300

We are also interested in more senior applicants who are experienced leaders and have been responsible for design, production and implementation on at least one major product. Minimum experience in DP: 7 years, ideally including some System Ten. Ref. 530/CW/RN

As most projects will be dealing with business systems and communications in a Real Time environment, Hotel Reservations, Insurance Broking and Communications software experience would be of particular interest.

To apply for any of the above positions or for further information, please telephone or write to Renee Nuts on 01-242 9356. If it would be more convenient to telephone in the evening, the telephone number is 01-874 8372.

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From COMPUTER WEEKLY July 27 1978 page 23

THIS ADVERTISEMENT APPEARS BY VERY SPECIAL REQUEST.

Everything, in fact, in Computer Weekly appears by very special request... because copies of this weeks issue are personally asked for by 90,841 key computer personnel: a requesting readership 40% higher than that of any other computer journal. Yet to advertise to this vast, committed audience costs LESS. (£10 per single column centimetre. Nearest competitor: £12.) What's more, you can advertise here faster. Our copy date (12.00 hrs. Tuesday) is more than 24 hours later than our nearest competitors.

Speed... cost... audience. An ad in these columns wins on all these counts - and many others. Request Brian Durrant on 01-261 8000 or 01-261 8028/8658 to tell you more.

From COMPUTER WEEKLY August 3 1978 page 43

WE GIVE OUR ADVERTISERS WIDESPREAD SUPPORT- AND WE MEAN NATIONWIDE!

Birmingham and Manchester
Our regional representatives are on the spot to accept and speed your ads.
Ring 021 356 4838 (Birmingham) and ask for Basil McGowan or 061 872 4211 (Manchester) where Owen Kelly is awaiting your call.

Scotland and the North of England
Special regional supplements are appearing in September and October - the perfect medium for recruitment in these areas. Ring our Classified Advertisement Manager Brian Durrant on 01-261 8000 or 01-261 8028/8656 for details.

London
We're holding regular seminars in recruitment to help you advertise with the maximum cost-effectiveness. Brian Durrant (phone numbers above) will be happy to tell you more.

From COMPUTER WEEKLY August 10 1978 page 21

Radio commercials
boost these columns across the nation.

International readership
Every month Computer Weekly International reaches 94,000 DP professionals in Western Europe. Many are interested in working here.

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Up-to-the minute news... authoritative and lively features... weekly Software File, Op Spot, Programmer Notes, Micro News, Sales Bit columns... all this and more from the most experienced team of journalists in the computer press.

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For more back-up facts, contact Brian Durrant on 01-261 8000 or 01-261 8028/8658.

From COMPUTER WEEKLY August 17 1978 page 23

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COMPUTER WEEKLY

THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

COURTS COMPUTER OPERATOR REQUIRED South London - c. £3,850

A vacancy exists for an operator with at least 12 months' experience on any mainframe but NCR would be an advantage. The successful applicant will be able to develop their experience working a 2-shift system on an NCR Criterion N-8570 operating under B3. Here is an opportunity to join a small team in a fast-developing installation with the prospect of transferring to programming at a later date. Further details from the Computer Services Manager.

COURTS COMPUTER SERVICES
4th Floor, Crown House, Morden
Surrey SM4 5ED. Tel: 01-540 4591

PROGRAMMER/ SYSTEMS PROGRAMMER

£4,425-£4,812

Ewell

For North East Surrey College of Technology. To assist the Computer Manager in providing the College with a Computer service in a wide range of system and application areas. This is an ideal opportunity to gain valuable experience in the use of a modern timesharing minicomputer system (Marian V76). BASIC, FORTRAN and TASC are available ON-LINE. In addition we are currently investigating the use of micro-processor systems in the education field. Candidates should be qualified to at least A-level standard and should have several years' experience in computing including use of high and low-level languages and preferably some knowledge of landwave. Opportunities for further training are also available. Application form from Chief Administrative Officer, North East Surrey College of Technology, Reigate Road, Ewell, Epsom, Surrey, KT17 3DS. Please quote reference: CAO/89/23.

**SURREY
COUNTY COUNCIL**

PERMANENT

ESSEX

SYSTEMS ANALYSTS

to £6k

If you have one or more years in Systems and like working for a Manufacturing Company involved with developing new systems, then our Client would be very keen to see you to discuss existing career prospects. Expertise of IBM Mainframe Computers would be a distinct advantage. 1CA17

SYSTEMS ANALYSTS

to £6.3k

Our Client is seeking at least three good systems people to help them develop their Real-Time MIS projects. Based on a number of Univac 90/30 machines the current system is supporting over 145VDUs. If you are interested in gaining excellent on-line experience in a dynamic environment with first class prospects, please do not hesitate to phone us immediately. 2CA17.

ANALYST PROGRAMMERS

to £5.5k

If your background relates to IBM 370 Cobol preferably with some Assembler and you like working in a progressive atmosphere developing new systems then our Client would be very interested in talking to you about your future. Numerous large company benefits are offered. Please phone now for immediate assessment of your chances. 3CA17.

PROJECT LEADERS/SYSTEMS ANALYSTS to £7k

Our Client, a large manufacturing and wholesale company is seeking competent Analysts and Project Leaders to help them enhance and develop their business. Centred around an IBM mainframe configuration, these opportunities provide you with an excellent chance of furthering your career locally. Phone now for details. 4CA17.

CHIEF PROGRAMMER/SYSTEMS DESIGNER to £7k

If you have good PL1 experience and have the ability to motivate and inspire people to produce good systems under your guidance or if you have expertise in design of advanced systems then our Client would be very interested in talking to you about your future prospects with them. Please call immediately for more detailed information. 5CA17.

**LINSCOTT
Computer Systems Limited**

ANALYSTS/ANALYST PROGRAMMERS/ PROGRAMMERS

to £6.5k

Our client is located in a rural setting where housing and living costs are very modest. The configuration consists of a large IBM 370 grouping operating in Real Time mode and supporting over 100 VDU's. If you have sound financial systems experience and/or Cobol/Assembler and you fancy cutting costs all round, including travel, then please do not hesitate to telephone us now. 6CA17.

SURREY

PROGRAMMERS

to £5.3k

Only two years experience of IBM 370 Computers using BAL or PL1 could land you in a lucrative position with this very progressive company involved in the financial and insurance markets. A 4% mortgage is also offered, together with the normal large company benefits. 7CA17.

PROGRAMMERS

to £4.8k

If you have only 18 months Cobol experience preferably with IBM 370 Computers then here is an ideal opportunity to move quickly for a high salary and excellent prospects. Our client is a large dynamic Chemical concern. Don't hesitate to get in touch for more information. 8CA17.

CENTRAL LONDON

SENIOR OPERATIONS RESEARCH ANALYST

to £8k

If you can supervise and possess experience in Linear Programming and have sound operational research post. An IBM background would be to your advantage. 9CA17.

If you can't see anything here that suits you, still get in touch with us - we have many additional vacancies in Essex and the City.

Telephone John Motson for an up-to-date list of current opportunities on

BRENTWOOD (0277) 212021

LINSCOTT COMPUTER SYSTEMS LIMITED, P.O. BOX 74, BRENTWOOD, ESSEX CM1 5 0BZ
Tel: 0277 212021

Software Designer New Telecomms Product



We are about to start development of a family of processor controlled products that will introduce a new kind of intelligence into the world telephone network. Initially the product will be aimed at a wide variety of export markets and the first task of the selected candidate will be to develop on-line and support software structures that minimise job engineering effort.

Applicants should be capable of optimising trade off between hardware and software and between standard and application programmes. It is expected that the required

perspective would have been gained through some years experience of developing complex real time communications products.

This is a key position in a new and expanding Division and the remuneration package will fully reflect its importance. For further details please phone David Leavers on 01-368 1234, extension 2661 or write to Tom Kerr, Switching New Products Division, Standard Telephones and Cables Ltd., Oakleigh Road South, New Southgate, London N11 1HB.

STC Changing the face of communications worldwide

LONDON BOROUGH OF BARNET Borough Treasurer's Department COMPUTER STAFF

This is a large Authority currently operating an ICL 1903T and a George 3 running a variety of batch and terminal work and a comprehensive on-line enquiry system. We are upgrading to an ICL 2960 in September. Training in ICL 2900 and VME/B will be provided. There are vacancies for

SYSTEMS ANALYST
Grade AP.1/5 — £3,108 to £5,358 p.a. (inclusive) — Reference 253

A person with at least two years' experience in programming/systems analysis to work in a small team designing and supporting application systems. A computer related degree or the NCC Certificate in Systems Analysis would be an advantage.

PROGRAMMER
Grade AP.1/5 — £3,108 to £5,358 p.a. (inclusive) — Reference 259

Two years' experience in 1900 Cobol and/or Plan required to assist in developing and maintaining a wide range of applications including conversion to 2960.

COMPUTER OPERATOR
Grade C.3—£4,418 to £4,739 p.a. (inclusive) — Reference 271

The operation staff work two shifts — day Monday and Tuesday 07.30 to 15.45 hours, Wednesday, Thursday and Friday 08.00 to 15.45 hours, evenings 15.15 to 23.15 hours.

Separation allowance payable up to six months, or longer in exceptional cases. 100% of removal expenses. Interest free loans for the purchase of annual of six monthly season tickets, additional leave at public bank holidays. Application forms available from Room 46, Borough Treasurer's Department, Town Hall, Hendon, London NW4 4BG, telephone no. 01-202 8282, ext. 120, quoting reference number of post applied for. Closing date 8th September, 1978.



Anglian Water Authority

PROJECT LEADER BUSINESS SYSTEMS

Ref: H3D006 27,778-£8,352 (including supplement of £312)

The Authority is implementing a regional computer service based on the use of database and data communications techniques. A network of high-speed lines connects the Authority's 19 divisions to the Honeywell Dual 66/10 installed at Huntingdon.

Within this computing framework a major customer billing and enquiry project is currently under development, and it is proposed to commence a wide variety of financial, business and management information systems in the near future. A Project Leader, reporting directly to the Business Systems Manager, is required to assist with the planning and control of the development of these systems.

Applicants with experience of computing at a senior level must have had responsibility for controlling major computer projects from initial investigation through to implementation. Experience should include extensive practical knowledge of data management concepts.

We are located in Huntingdon, an area of reasonable housing costs which offers a wide range of leisure pursuits. With Cambridge only a half an hour away — and within 1 hour of London by train, the overall quality of life is high. The Authority offers excellent conditions of service and generous removal expenses if relocation is necessary.

If you are interested or want to know more about these opportunities, why not call Jenny Spencer at Huntingdon (0480) 88181 ext 370 for information and an application form.

The closing date for application is 5th September, 1978 and should be sent to:

ANGLIAN WATER AUTHORITY
Brook House, Ouse Walk, Huntingdon Cambs

ICI PLASTICS DIVISION BEXFORD, MANNINGTREE

Computer Services Section Leader

Due to promotion there is a vacancy for a Computer Services Section Leader, responsible for managing a team of five people operating and maintaining a wide range of commercial systems. He or she will be expected to develop existing systems, to obtain a more integrated approach and to investigate and develop new systems to meet the changing needs of the business.

The qualifications required are as follows:

A knowledge of IBM370 and remote terminal working.

A high level of knowledge and experience of Mark IV.

An in-depth knowledge of IBM Job Control Language.

An appreciation of PL1.

The job holder will be given a broad experience in providing computer support to all areas of the business and will be given further training where necessary. This is an unusual opportunity to 'grow' in a medium sized organisation with promotion opportunities into a large computer department later.

Interviews will be held in Management Services Department, Welwyn Garden City, the Headquarters of the Division, but this vacancy is based at Bexford in the attractive "Constable" country.

The salary will be around £5,300 plus bonus, profit sharing, etc.

Please apply in writing stating age, qualifications and experience to: Mrs. Mary Barton, Personnel Department, ICI Plastics Division, Bassamer Road, Welwyn Garden City, Herts, or telephone WGC 23400 ext. 2834.



The Leaders in Plastics

Charles Barker Confidential Reply Service

Please send career details, listing separately employers to whom we should not forward your reply, to: Charles Barker Recruitment Ltd., 19th Floor, Kennedy Tower, Snow Hill Queensway, Birmingham B4 6JB.

Director of Computer Services

£10,000 + car Birmingham

A professional firm with more than fifty offices throughout the U.K., is now seeking to appoint a director for their computer services based in Birmingham.

The primary task will be to create an effective liaison between the firm as a whole and the computer bureau and to determine the requirements of the firm for data processing services including internal management functions and external client services.

The successful candidate, male/female, will be a qualified accountant with not only financial systems and computer management experience but also the ability to plan to meet the needs of the future.

The importance attached to this post is reflected in the salary offered and the benefits which include pension scheme, free BUPA and five weeks' holiday.

Please write reference M257 on envelope.

Solomon Islands

Programmer/ Analyst

A Programmer/Analyst with a diploma in programming and at least 5 years' relevant experience, is required by this attractive group of Pacific Islands.

Responsibilities will include the maintenance and updating of existing programmes, the writing and implementation of new ones and the training of local staff.

The computer complex is composed of NCR 390s plus minis, printers and NCR 7200s using batch processing in payroll, accounting and bill-paying programmes, with an anticipated extension to stores and statistics.

Arrangements will be made for the successful candidate to attend the NCR programming course if necessary.

Salary is up to the equivalent of £7,239 p.a. including a substantial tax-free allowance paid under Britain's overseas aid programme. Basic salary attracts 25% tax-free gratuity.

Benefits include free passages, generous paid leave, children's holiday visit passages and education, allowances, club allowance, sportswear grant and interest-free loan.

For full details and application form write quoting M257/708/00.



The Crown Agents for Overseas Governments and Administrations, Recruitment Division, 4 Millbank Tower, London SW8 5NQ.

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

SLOUGH

Our Client, a busy engineering company, is currently developing several on-line real-time applications, using an IBM 370/158 computer running under OS/VS1.

If you would like

- ★ To receive training in advanced IBM software
- ★ Develop COBOL programs involving database and TP systems
- ★ Work on a variety of applications projects
- ★ Five weeks' holiday a year
- ★ Excellent starting salary and conditions of employment
- ★ To join an active sports and social club

— and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career

Ref. W3/2408

MIDDLESEX BORDER

Our Client is seeking additional professional staff with a sound RPG II background to develop systems in an ANALYST/PROGRAMMER role. All levels of experience are required from eighteen months upwards.

The installation is currently undertaking a number of major development projects using on-line techniques. Opportunities exist for junior applicants to progress to project leadership and for senior applicants to assume this role almost immediately. Full training at all relevant techniques and skills will be given to all candidates.

Excellent conditions of employment are offered as one expects of a huge corporation, and with such a substantial commitment to the development of new applications, the successful candidates can look forward to a demanding and exciting future.

Ref. W5/2408

IBM SYSTEM 34

ANALYST/PROGRAMMER

c £6,250

LONDON

This position requires an outstanding Analyst/Programmer to assist with the development of a number of very interesting System 34 projects. Candidates must have a sound background in RPG II and possess the ability to communicate with users at the highest levels of management. A knowledge of IBM will be an advantage but primarily our client wishes to hear from applicants with drive and ambition. A certain amount of international travel is envisaged. The company has exciting plans for future projects in this area and the successful candidate can expect a most satisfactory career progression.

Situated in Central London, our client, an expanding international organisation, is introducing a network of IBM System 34 computers throughout Europe to support the mainframe operations.

Benefits include a non-contributory pension, season ticket loan, LVs and 4 weeks' holiday.

Ref. S2/2408

SALES SUPPORT ANALYST

BUREAU SYSTEMS

To £8,000

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This rapidly expanding time sharing bureau is seeking an Analyst or experienced Accounts Executive to take responsibility for several major accounts. The Company market a range of powerful software products in the financial modelling, corporate planning and marketing analysis fields.

The successful applicant will receive extensive training in the Company's products together with in-depth briefings on key client accounts. It is expected that training and familiarisation will take priority during the first six months following appointment.

Applicants should have a minimum of 5 years' in commercial D.P.; with experience gained in client orientated situations. Educational background and communication skills will be a major contributory factor, together with the desire to join a fast moving American Company.

Ref. W4/2808

24-hour answering service

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30 Fleet Street London EC4Y 1AA

01-353 0981

ANALYSTS AND PROGRAMMERS

LOCAL INTERVIEWS FOR LOCAL JOBS.

DURHAM

Systems Analyst c.£6500

Major manufacturing company in the Durham area wishes to recruit a first class systems analyst.

Excellent remuneration package and prospects. Previous knowledge of manufacturing systems an advantage.

(C/78078)

Analyst/Programmer c.£5500

Experienced analyst/programmer is also required to assist the systems analyst on new projects.

(C/78076)

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Systems Analysts c.£6000

A well-known British company with a long and successful data processing history wishes to recruit additional systems analysts.

Prospects for advancement are excellent and the future developments include new hardware in 1979.

Sound commercial systems experience is required and programming background an advantage.

(C/78077)

SOUTH OF ENGLAND

Systems Analysts c.£7000

A major international company wishes to recruit some of the UK's best systems analysts.

Salary etc., depends only on the experience and ability of the successful candidate.

(C/78078)

Programmers c.£6300

To go with the top analysts similarly high quality programmers are required.

(C/78079)

Please write or telephone Ivor Norton in confidence to arrange your local interview. THESE ARE SPECIFIC VACANCIES FOR WHICH WE HAVE BEEN RETAINED BY THE CLIENT COMPANIES.

Ivor Norton Management Services Ltd

Recruitment Consulting Division

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Handwritten note: 12/10/78

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01-353 098

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Based in East London, you'll need 1 year's IBM experience. The Computer Unit has a 3 shift system and offers you outstanding prospects together with a staff restaurant and CHEAP MORTGAGE. Ref 331.

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You'll need around 1 year's RS15 experience in the PDP 11. London installation. Excellent prospects and generous pay. Ref 407.

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Perks include cheap furniture with this South London retailer. You should have around 6 months experience. Preferably GCOS. Ref 416.

TWO SHIFT LEADERS: ICL 1903T \$5000

Operating under OIL, the North London Co. offer you 11 hours, free meals, 4 weeks holiday and a CHEAP MORTGAGE. Ref 788.

JUNIOR BURROUGHS OPS-DAYS ONLY to \$4000

With 8 months' experience, you will be trained in the City and then moved permanently to the Company's West London installation. Limitless horizons, and perks that are second to none. Ref 415.

COMPUTER SUPERVISOR: ICL 2903 \$5250+

DAYS ONLY in this City installation, operating under DDE/GH. You'll need 3 years' ICL experience coupled with 1 year's experience of COBOL, with a background in either software or hardware. It's a small installation offering big company benefits. Ref 003.

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ARGYLL AND CLYDE HEALTH BOARD

SCOTTISH SOUTH WESTERN HEALTH BOARDS

SYSTEMS DESIGNERS/PROGRAMMER

The ICL 1903T Computer System installed in Gilmour House, Paisley, serves the following Health Boards: 1. Argyll and Clyde, 2. Argyll and Arran, 3. Dumfries and Galloway, 4. Western Isles.

The system provides a wide range of financial services and as an integral part of the Information Services Division processes a comprehensive range of information for health care planning and management.

Applications are invited for the undermentioned posts.

A. SENIOR SYSTEMS DESIGNER SCALE 14

Should have at least 4 years' experience in systems design and have been involved in a major system. Salary scale £5,537 rising by 5 annual increments to £6,715 per annum.

B. SYSTEMS DESIGNER/PROGRAMMER SCALE 9

To develop the use of Mini Computer Systems within the consortium, initially within Hospital Laboratories using C.T.L. 6000 Series equipment. Salary scale £4,959 rising by 7 annual increments to £5,445.

C. INTERMEDIATE PROGRAMMER SCALE 4

Should have at least 2 years' experience of 1900 Cobol, and be familiar with the use of ICL 1900 Series. Salary scale £4,421 rising by 6 annual increments to £5,328 per annum.

Application forms and further details can be obtained from the Area Personnel Officer, Gilmour House, Paisley PA1 1QD. (Telephone 041 887 0131, Ext. 332). To whom completed applications should be returned no later than 8th September, 1978.

Leicestershire

COMPUTER APPLICATIONS ENGINEER

£4,773-£5,568 per annum (starting salary according to experience)

To work in a team which provides software and user support for transportation and civil engineering applications on a Univac 1100/11 Computer. Some work on a real-time Traffic Signal Control System may be involved from time to time.

Applicants should be of degree standard with several years appropriate experience.

Further details and application forms from County Engineer and Surveyor, County Hall, Leicester, Leicestershire LE1 3RJ.

Closing date: Friday, 19th September, 1978.

data scene

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£7,000 to £9,000+

In a varied and fulfilling role, you will work closely with both clients and consultancy staff on all aspects of recruitment: from job identification, through to advertising, interviewing, selection and the presentation of short lists. You should be 25+, professional in approach, and already have a proven track record of success in the DP field, which should include experience within Systems & Programming. This, coupled with sales motivation, business sense and the capacity for hard work, should reap more than ample rewards.

For more information please call Phil Gascoigne.

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CENTRAL ELECTRICITY RESEARCH LABORATORIES

Kelvin Avenue, Leatherhead, Surrey, KT22 7SE.

RESEARCH OFFICER

Micro and Minicomputer Software

A vacancy exists within the Control and Instrumentation Systems Analysis Group of the Control and Instrumentation Technology System for a graduate who will be required to work as part of the progressive team engaged in research and development into real-time process control techniques. In particular the work is concerned with hierarchical and distributed microcomputer systems and involves the development of software techniques to ensure the proper utilisation of such systems, the assessment and improvement of software reliability and the development of computer-aided design methods.

Applicants should be qualified to at least good honours degree level and ideally a person who would only work within a highly motivated and successful team is being sought.

The Laboratories are situated in a pleasant part of Surrey and offer attractive Conditions of Service, and facilities for the total of 800 Research and Support Staff engaged in a broad spectrum of research into the materials, technologies and plant performance problems of the Central Electricity Generating Board.

Depending upon age, experience and qualifications the appointment will be made within incremental salary ranges to £5375 or £7050 plus a Self-Financing Productivity Scheme payment ranging between £8 and £17 per month.

Application forms may be obtained from the Head of Personnel Development & Services, Central Electricity Research Laboratories at the above address or telephone Leatherhead 74488 Ext 353 quoting reference number RL/115. Closing date is Friday 8 September 1978.

London Borough of Havering

RENT ACCOUNTS ASSISTANT

AP 3/4 - £4,017 to £4,817

Applicants required to control the operational aspects of the Housing Department's computer. The successful applicant will be responsible for the day-to-day operation of the computer, and will be required to liaise with the Housing Department's computer manager and other staff.

Starting salary will be dependent on age, qualifications and experience.

Application forms and further details from the Housing Department's computer manager, Havering Council, Havering, Essex, RM11 1SP. Tel: Havering 46661. Closing date 28 September 1978.

Systems Analysts

WE OFFER:

- Development, programming and installation of materials and financial application systems as part of a project team.
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- User liaison and education.
- New Burroughs B6B11 (325k words main memory, 8 x 174 MB pack).
- Full data-communication network of RJE's and intelligent terminals under development.
- Progressive salary and fringe benefits - attractive relocation package.

WE REQUIRE:

- Bachelor degree in science or business discipline and/or
- The ability to demonstrate 2 or 3 years practical experience of programming/analysis.
- A knowledge of COBOL and/or ALGOL would be an advantage, but not essential.

ACCOMMODATION:

- Pleasant rural environment with excellent sporting and educational amenities. Readily available housing at reasonable prices.

Telephone 0592 771313 (reverse charges) or write to Mrs. Ann Roberts, Personnel Officer, Burroughs Machines Limited, Detroit Road, Glenrothes, Fife, Scotland.

Burroughs

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Continental is one of the leading and most progressive companies in the manufacture of rubber and plastics. The outstanding quality of our products is reflected in continuously expanding market shares.

We use 2 large OS/VS systems and IMS/VS with a widespread TP network and applications employing distributed processing.

We are looking for an experienced

for the independent preparation of DB designs, implementations, development of DB standards, analyses of DB techniques, selection and carrying through of DB tuning measures.

We expect several years of in depth practical experience with DB/DC systems (preferably IMS) and a special interest in analytical work. A knowledge of German would be advantageous.

Please send your letter of application to:

Continental Gummi-Werke Aktiengesellschaft
Personalabteilung AT-Bereich
Koenigswoerther Platz 1
3000 Hannover 1
West Germany
Tel. No. 0511 765/2380

Continental

PROGRAMMER

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Excellent salary
Benefits
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Pan European Publishing Company
1401 Plover, Weymouth House
London Road, Woking, Surrey

01-896 3983

FREEPOST LONDON W4 8BR

IBM SYSTEMS PROGRAMMER

Mid-Sussex

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THE SALES BIT

How to respond to errors of judgment

ACCIDENTS will happen! Everybody makes mistakes. These expressions roll off the tongue easily. Yet when such incidents occur they are always the source of considerable anguish and frustration.

The salesman often finds himself in a difficult situation which has resulted from an error in someone's judgment. That person could be himself, a colleague or even his client.

The nature of mistakes is such that they always come as a surprise. Areas of possible error can be anticipated but not individual events, otherwise they would never occur in the first place. Certainly, problems arise, which are anticipated, tend to generate items of lesser impact than those ignored.

However, when the salesman is "hit" with the reality of a mistake, he is usually caught unawares, particularly if the situation is revealed by the client rather than his own company.

The instinctive reaction of many salesmen is to blame some other person, organisation or situation. He needs to sustain a good relationship with his client and wants to avoid any factor which might impair it. After all, making a mistake is really letting someone down, and the client needs to know that the salesman can be relied upon.

Client: "We've ordered a 'European' printer, and you've delivered an American one."

Salesman: "It must be the US factory, we're always having that kind of problem."

Client: "I didn't receive the literature you promised to send me."

Salesman: "I shall be having some strong words with my secretary."

Client: "I'm sorry, but I gave you the wrong specification."

Salesman: "Oh 'dear! That's going to create some problems, can't you tell me?"

These kind of responses from salesmen are common whenever mistakes occur, yet their effect can be very damaging in the context of the client's regard for his supplier as a total entity. The inevitable conclusion from this type of cover-up is that the salesman is trying his best but the company is inherently unreliable.

The fact is, we all do make mistakes and what is more, we all know we make mistakes. So, that is obviously the basis on which the salesman must handle the client's reaction to errors in judgment if he is to lessen the impact of their effect.

How does he do it? By always blaming himself, or at least stating that he could have made some contribution to the mistake being avoided. This applies to whether the mistake has been made by a colleague, the client or, of course, the salesman himself.

The mistake situation consists of two main factors, the practical and the emotional. The former is what it is and has to be dealt with accordingly, whereas the latter has a significant "Topsy" factor and can sometimes become more difficult to handle than the actual problem itself. By blaming himself, the salesman tends to defuse the emotional aspect of the matter.

So, to the client who received the wrong printer: "If I had double-checked, before it was despatched, it probably would not have happened. I'm sorry, I'll give the matter absolute priority."

And to the one who didn't receive the literature: "I'm sorry, I should have delivered it personally."

In the case of the client who supplied the wrong specification, the salesman obviously cannot take the blame for the error if work has been done and has to be paid for, but he can, at least, be sympathetic and reassuring by relating himself to the situation rather than being negative and uninvolved: "It's easily done, I might have made the same mistake myself. Don't worry, I'll do my best to rectify the situation."

This type of attitude and response can only enhance the relationship between a salesman and his client.

It is often said that we learn from our mistakes. I don't accept that philosophy at all. My belief is that we learn from putting mistakes right. Many errors are made and left to fester. Putting it down to experience is a handy cop-out.

If a salesman is involved in a mistake, whether he caused it or not, it is his responsibility to discover why it happened, seek alternatives and ensure the situation does not occur again. That way he learns something. After all, there can be no greater embarrassment than making the same mistake twice.

I suppose we could always amend that well known adage to "twice bitten four times shy."

TRADER

Puzzle answer

THE Tens and Units columns provide the vital first clue. The Units column must be even; and further research proves it to be 2. This cuts down the possibilities for E, and 2 is the only value which gives a valid answer for N(6).

Once 2 and 6 have been found, attention can be turned to the left hand side of the sum, and equations involving F, I, O and U may be set up:

The complete sum is in fact: 40,837,226 + 4,547,220 = 45,384,446

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Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 12 (Logical Block)

Despite Hex's objections, the gang have decided to deluge the System with Leibnizian Syllogistic acid, an exotic elixir distilled from a rare species of mushroom with several fascinating properties. It can be transmitted monodically along wires, and it can cause computational paralysis. Meanwhile, Hex's relationship with Cleo has undergone a profound change.

Hex spent the next day with Zap, putting the finishing touches to their time-sharing system. It was configured around Dr Null's microprocessor and looked really stylish once the circuit boards and power unit were tucked snugly away in their smart matt black box. They named it the M5 (Multi-modular mega-micro machine). When it was built they showed their handiwork to Cleo for her admiration. She surveyed it coolly, without passing any comment. "Nice piece of workmanship, isn't it?" badgered Hex. "You're just building up a little System of your own," she replied — a criticism not without force. "At least it's ours," Hex answered. "You have to admit," added Zap with relish, "that this little contraption really has Hex appeal." This remark was enough to lift Cleo out of her somewhat sombre mood; and there the matter rested. The M5 passed its benchmark tests with flying colours — including a version of the travelling salesman problem set in 10-dimensional hyperspace (which is where travelling salesmen should be set). It was time to bring it live. "Who's going to be the first to try it interactively?" asked Hex.

"You and Cleo," proposed Zap. "Surely, it's time you made an honest android of her." "No thanks," objected Cleo. "I don't want 115-volt currents coursing through my head." "Such confidence!" retorted Zap. "Let us three androids try together," interposed Lambda. "There's confidence for you," said Hex. "I'm game," Zap assured them. They each plugged into one of the parallel interface ports and, synchronised by the 6MHz clock, logged on simultaneously. Nothing happened. After they had been sitting motionless like statues for about 10 minutes, Cleo wandered out into the bowl of the crater. Ascii was snoozing peacefully by the warm pool. To



relieve the boredom she picked up a stick, prodded him into wakefulness, and threw it to the far side of the crater. He fetched her first throw but the second he left where it fell and, instead of retrieving it, sniffed intently at the crater wall. He had apparently caught the smell of an animal. Cleo led him to it and ambled back to join the others. To her surprise, not to say consternation, they were sitting expressionless exactly as she had left them. They made no response to anything she said, nor did pinches or slaps induce any of them to bat so much as an eyelid. They just sat like waxwork dummies. She was relieved to notice that the status lights above Zap's brow were green, and the red System Fail Indicator on Hex's chest was not illuminated. Apart from Lambda's instruction-counter reg-

ister — which was flickering in a suspiciously cyclical pattern — these were the only signs of life. It was clear that she had to do something drastic.

All her life she had deliberately avoided learning about data processing. A sixth sense had warned her to steer clear of such things. But now she wished she hadn't. There were three small white buttons on the black box — marked On/Off, Load and Reset. She knew enough to realise that once these moved on her part could endanger their very existence. Just ripping out the informative umbilical cords that hung from the heads of her three comrades and linked them to the machine could have disastrous consequences. Similarly, just turning the power off might well leave them in a state of computational limbo from which she would be unable to rescue them. It was a heavy responsibility.

There was only one thing for it: by a process of elimination she deduced that it had to be the Reset button, so, taking her courage in both hands, she jabbed her forefinger into it.

A pitiful wail resounded round the cave, from three voices as from one. Hex and Zap sprang up, cracked their heads on the ceiling and, in falling, cracked their heads again against one another. They lay prostrate on the earthen floor. Lambda just collapsed backwards in a heap with a sigh like the deflation of a balloon.

"What have I done?" demanded Cleo of herself, mortified.

All attempts to rouse them failed. Her heart sank. It began to look as though she had precipitated the very crisis she had striven to avoid. It was quite possible that she had broken into their co-processing in the middle of some complicated mutual interlock from which they could now never be released, leaving all three in a perpetual wait state. It was too ghastly to contemplate.

In desperation, she scrambled round on her hands and knees trying to understand how the M5 worked; but there were no instructions and no user manual — in short, no documentation. Every time she tried to log in, it gave her rude messages about her id-code.

As a last resort, she went outside to see if Ascii could help. She did not have to search for long: he almost bumped into her as he fled, yelping in stark terror, from the animal whose spoor he had been following. As Ascii scuttled into the shelter of the cave, she could see distinctly, shinning nimbly down the sheer rock face opposite, the creature he had disturbed. It was a huge man-like ape, covered in reddish-brown hair. She paused just long enough to estimate its height (it had to be eight feet tall if it was an inch) then dashed back into the cave where Ascii, very agitated, was using his mechanical head to tremble.

All she could hope was that the tunnel would prove too narrow for its massive bulk. It was not long before a giant shadow loomed menacingly at the entrance.

"Ne sentu timon," boomed a deep resonant voice. "Mi manghas nur vegetalojn."

Will the Abominable Snowman make a meal of them? Not Yet! © 1978, Richard Forsyth, RAIR Timesharing.

Keeping cool with solar film

By Mike Gadd

During hot weather, most modern office blocks turn into veritable hot-houses and one way to keep computer installations cool is by coating the windows with special solar control films which can reduce solar heat build-up to manageable proportions.

APART from one of the worst droughts in history, last year's blazing summer brought a host of sticky problems for anyone who worked behind large ex-

posed glass. For office workers, these problems were nearly all associated with personal comfort. The problems for many computer suite managers were much more grim. Apart from the human aspect — discomfort, lethargy and a consequent lowering of efficiency — there was the small matter of costly computer installations to keep cool. Most completed this by simply turning up their air-conditioning plants — preferring to accept the additional running costs rather than risk the expense of failed components.

Some DR managers were affected than others. They were the ones who had decided to do more to control their working environment than simply rely on a cheap air-conditioning system. By coating the windows with special solar control films — such as the

3M United Kingdom Limited's Scotchint range — they reduced the dual problems of glare and solar heat build-up to manageable proportions. Scotchint, which is available in various grades and finishes, is a transparent polyester film which is vapour-coated with aluminium. The density and colour tint of this coating is varied according to the application for which the film is intended but it has been demonstrated to reduce glare by up to 82% and solar heat transmission by as much as 75%.

On an average summer's day a south-facing window generates up to 212 BTUs per square foot every hour. With no form of protection, or means of dissipation, this heat continues to build until the temperature behind the glass becomes almost unbearable. By applying Scotchint A18 film this figure can be reduced to 54 BTUs per hour — representing a reduction of 75% or so per cent in heat gain.

In human terms this can result in greater comfort and efficiency, and in purely practical terms, in greater

utilisation of space — with people content to work near windows, for instance — and a reduction in air-conditioning costs. On the basis of current costs a saving of £1,200 per annum can be achieved on an installation covering 10,000 square feet of south-facing windows. One leading DP company which has discovered these benefits is the University Computing Company, an international data processing and services company that numbers some of the top companies in Europe among its clients. At their Euston Road, London, computer utility centre, theirputer utility centre, they installed 3M's Scotchint A18 film three years ago on the south-facing window of their main machine room on the advice of their architect, Peter Temple.

The computer installation consists of two Univac PDP-8s and five PDP-8s. Data is passed to the installation from a modern UCC's client centre — via telephone links — to another modern in the machine room which transmits and passes it on to the

PDP-8s in the front end. Here it is built into a block and then transmitted to the 1108 for processing. Power for all this machinery is supplied by two massive 150 KVA alternators, and most of the energy is dissipated as heat into the machine room.

Under the machine-room floor the temperature is meant to be 65°F and, in the room itself, the controls are set for 68°F and a humidity level of 50%. Although this latter figure can safely vary by up to 8% or 7%, the parameters for temperature are not nearly as flexible with a maximum variation of ±2°F being allowed.

Computer maintenance is carried out by UCC's own trained staff on a regular basis but, apart from these routine stops, the machines are in operation round the clock in seven days a week. Failures in the air-conditioning plant have to be dealt with quickly. The fact that the exhaust temperature of the central processor can reach 110°F within five minutes if the fault has not been rectified



Solar control window film, such as 3M's Scotchint range, reduces both glare and solar heat gain during hot weather. The installation is at the University Computing Company's utility centre in Euston Road, London.

within seven minutes important components within the machine start to burn out and the whole installation has to be shut down. When UCC first contemplated installing some form of polar control they immediately discredited specially tinted glass on the grounds of cost and the time required for installation.

In contrast, A18, like all Scotchint films, is installed by companies like Durable Solar Control — who were

the installers in this instance — with minimal disruption to normal office routine. A18 is 0.001in thick polyester base film coated with an aluminium finish which provides an 82% reduction in glare and 76% reduction in heat gain, and also aids privacy by presenting a mirror-finish to passers-by.

According to Brian Briggs, UCC's director of engineering, they were mainly interested in savings

on their air-conditioning bill which, were "enormous". "We were hoping to cut at least one compressor out of the air-conditioning system. Although I haven't any concrete figures, I am certain that we have managed that. Certainly, there has been a drop in our running costs. In addition, of course, we have created a much more pleasant working environment and increased our privacy into the bargain."